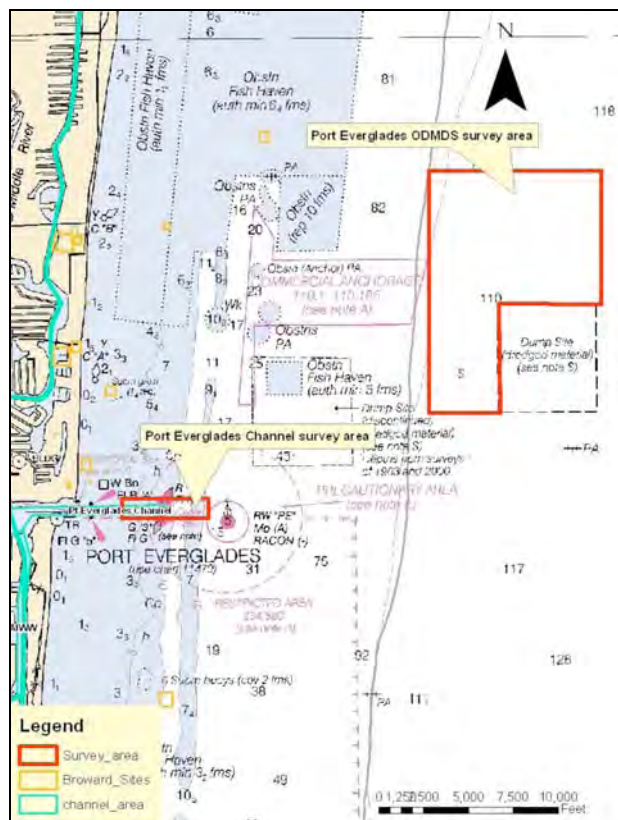




U.S. Army Corps of Engineers
Jacksonville District

Contract No. GS-10F-0196P
Order No. W912EP-11-F-0018

SUBMERGED CULTURAL RESOURCES REMOTE SENSING SURVEY OF THE PORT EVERGLADES CHANNEL AND OCEAN DREDGED MATERIAL DISPOSAL SITE, BROWARD COUNTY, FLORIDA



SUBMITTED TO:

U.S. Army Corps of Engineers
Jacksonville, Florida

SUBMITTED BY:

Panamerican Consultants, Inc.
Memphis, Tennessee

FINAL REPORT ♦ FEBRUARY 2012

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**CONDUCTED UNDER:
FLORIDA ARCHAEOLOGICAL RESEARCH PERMIT No. 1112.009**

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ABSTRACT

The U.S. Army Corps of Engineers, Jacksonville District is studying a potential offshore area for use as Ocean Dredged Material Disposal Site for Port Everglades. Specifically, the Project Area consists of a portion of the Port Everglades channel and the potential Ocean Dredged Material Disposal Site. The channel area is approximately 1,000 feet wide by 5,000 feet long. The second area, the Ocean Dredged Material Disposal Site, is approximately 4 square miles in water depths that range from 600–700 feet. As an agency of the Federal Government, the U.S. Army Corps of Engineers, Jacksonville District must consider the effects that their project activities will have on cultural resources. Therefore, they are responsible for determining if any potentially cultural resources are located within the current Project Area, and if so, are eligible for listing on the National Register of Historic Places prior to the implementation of any project activities.

Comprised of a magnetometer and sidescan sonar, the survey located a total of 282 magnetic anomalies and 174 sidescan sonar contacts. This is further broken down into the Ocean Dredged Material Disposal Site, in which were located 153 anomalies and 82 sidescan sonar contacts, and the channel area in which were located 129 magnetic anomalies and 92 sidescan sonar contacts. Analysis of the data indicates eight anomalies are classified as unknowns or debris and comprise three clusters, including M038 and C023; M176, M177, M227, M226 and C116; M226, M261 and M262; and one single sonar contact, C070. Together the clustered anomalies form moderate strength dipoles of fairly significant length, indicating potentially significant submerged cultural resources. In addition, the cluster consisting of M266, M261 and M262 has a magnetic moment with negative to the north, indicating a strong possibility of a shipwreck site. Because of these factors, the targets must be considered as potentially significant.

In addition to these, Anomaly M156 appears to be related to a submerged breakwater located south of the Project Area, the breakwater listed in the FMSF as 8BD4255. From the appearance of the anomaly, the source lies outside the Project Area. Although the breakwater was determined potentially NRHP eligible, it is unlikely to be affected by the current construction project and no further work is recommended.

Because the parameters for the proposed Ocean Dredged Material Disposal Site project are unknown (i.e., area of disposal, type of material), it is not known if any of these potentially significant cultural resources will be adversely impacted by project activities. It is therefore, recommended that the U.S. Army Corps of Engineers, Jacksonville District determine the exact parameters of the project impact and subsequently determine if any of the potentially significant sites will be adversely impacted. If the potentially significant sites will be impacted and cannot be avoided, it is recommended that the U.S. Army Corps of Engineers, Jacksonville District conduct an assessment of the integrity of the sites and their historical significance, based on the National Register of Historic Places nomination eligibility criteria. Based on site type, subsequent investigations, if required, should include, but not be limited to, archaeological diver or remotely operated vehicle assessment. Discussions should be conducted on which method(s) should be employed on the respective feature.

ACKNOWLEDGEMENT

The successful completion of this project is the direct result of the input and hard work of numerous individuals. The authors would first like to thank the U.S. Army Corps of Engineers, and specifically Ms. Wendy Weaver of the Jacksonville District for allowing Panamerican Consultants, Inc. the opportunity to conduct this investigation.

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I. INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Jacksonville District is studying a potential offshore area for use as Ocean Dredged Material Disposal Site (ODMDS) for Port Everglades. Specifically, the project area consists of a portion of the Port Everglades channel and the potential ODMDS. The channel area is approximately 1,000 feet wide by 5,000 feet long. The second area, the ODMDS, is approximately 4 square miles in water depths that range from 600–700 feet (Figures 1-01 and 1-02). As an agency of the Federal Government, the USACE must consider the effects that their project activities will have on cultural resources. Therefore, they are responsible for determining if any potential cultural resources are located within the current Project Area, and if so, are eligible for listing on the National Register of Historic Places (NRHP) prior to the implementation of any project activities. The federal statutes regarding these responsibilities include: Section 106 of the National Historic Preservation Act of 1966, as amended (PL 89-665); the National Environmental Policy Act of 1969; the Archaeological Resources Protection Act of 1987; the Advisory Council on Historic Preservation Procedures for the Protection of Historic and Cultural Properties (36 CFR Part 800); and the Abandoned Shipwreck Act of 1987. The work must also be in compliance with Section 276.12, *Florida Statutes*, Chapter 1A-32 and 46 of the *Florida Administrative Code*, and it must be permitted by the Florida Division of Historical Resources under Chapter 1A-32.

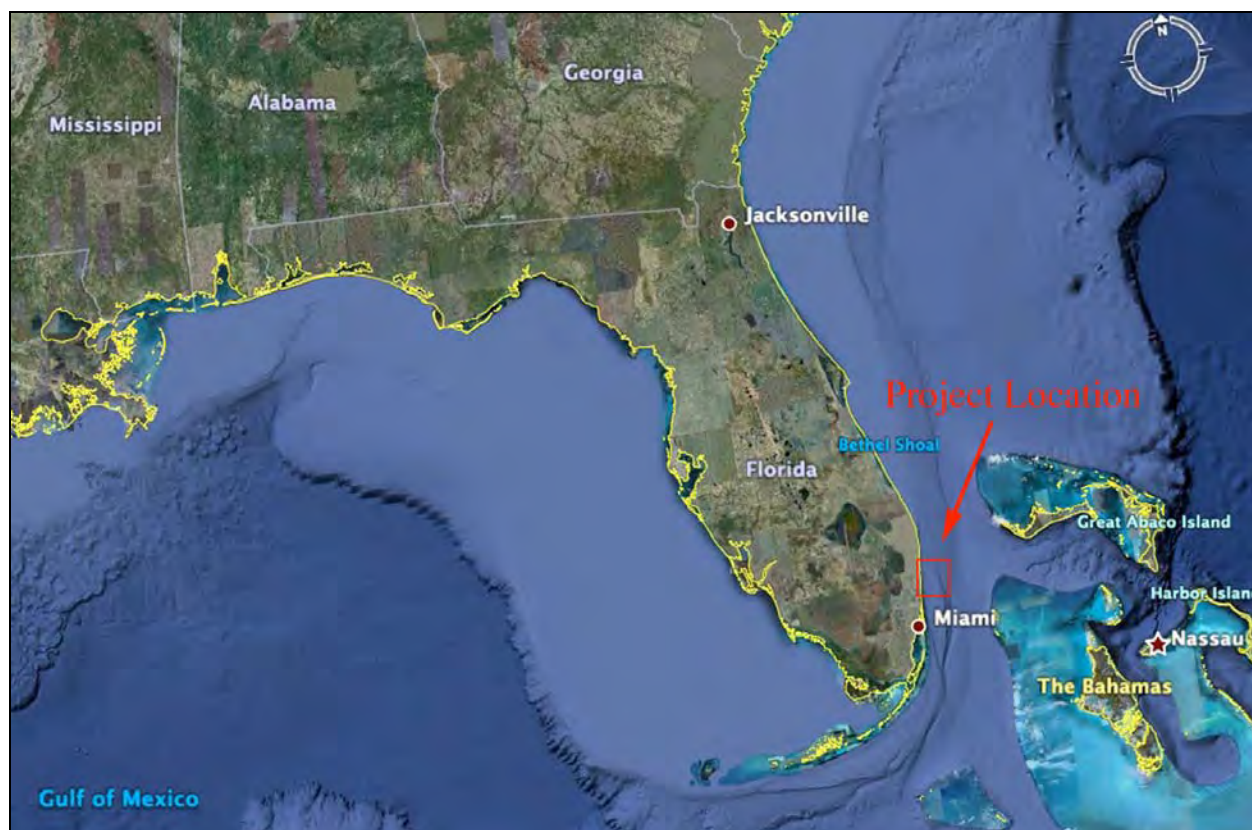


Figure 1-01. Project area location map (courtesy of Google Earth).



In order to comply with the USACE's responsibilities towards cultural resources, Panamerican Consultants, Inc. of Memphis, Tennessee (Panamerican), was contracted by the USACE to conduct a comprehensive remote sensing survey of the submerged project area. In response to the USACE's Scope of Work (SOW) entitled, *Submerged Cultural Resources Remote Sensing Survey of the Port Everglades Channel and Ocean Dredged Material Disposal (ODMDS) Site, Broward County, Florida*, Panamerican conducted the survey between November 11–15, 2011 for the Jacksonville District, under Contract No. GS-10F-0196P, Order No, W912EP-11-R-0018, and Florida 1A-32 Permit No. 1112.009.

Comprised of a magnetometer and sidescan sonar, the survey located a total of 282 magnetic anomalies and 174 sidescan sonar contacts. This is further broken down into the ODMDS, in which were located 153 anomalies and 82 sidescan sonar contacts, and the channel area in which were located 129 magnetic anomalies and 92 sidescan sonar contacts. Analysis of the data indicates eight anomalies are classified as unknowns or debris and comprise three clusters, including M038 and C023; M176, M177, M227, M226 and C116; M226, M261 and M262; and one single sonar contact, C070. Together the clustered anomalies form moderate strength dipoles of fairly significant length, indicating potentially significant submerged cultural resources. The cluster consisting of M266, M261 and M262 has a magnetic moment with negative to the north, indicating a strong possibility of a shipwreck site. Because of these factors, the targets must be considered as potentially significant.

In addition to these, Anomaly M156 appears to be related to a submerged breakwater located south of the Project Area, the breakwater listed in the FMSF as 8BD4255. From the appearance of the anomaly, the source lies outside the Project Area. Although the breakwater was determined potentially NRHP eligible, it is unlikely to be affected by the current construction project and no further work is recommended.

Because the parameters for the proposed ODMDS project are unknown (i.e., area of disposal, type of material), it is not known if any of these potentially significant cultural resources will be adversely impacted by project activities. It is therefore, recommended that the USACE determine the exact parameters of the project impact and subsequently determine if any of the potentially significant sites will be adversely impacted. If the potentially significant sites will be impacted and cannot be avoided, it is recommended that the USACE conduct an assessment of the integrity of the sites and their historical significance, based on the NRHP nomination eligibility criteria. Based on site type, subsequent investigations, if required, should include, but not be limited to, archaeological diver or remotely operated vehicle (ROV) assessment. Discussions should be conducted on which method(s) should be employed on the respective feature.

Divided into chapters on Historical Context, Field Methods, Investigative Findings, and Conclusions and Recommendations, the following report presents the conduct and the results of the investigation.

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II. HISTORICAL CONTEXT

GEOLOGIC CONTEXT

Data useful for evaluating the potential for submerged prehistoric sites are those that reveal the progressions of paleolandscape settings during times of lowered late Pleistocene and Holocene sea levels, along with distributions of relevant archaeological sites, in order to model where people may have extended their land use in now submerged locations (Gusick and Faught 2011).

Understanding the antecedent landscape and the chronology of sea level transgression contributes to modeling the paleolandscape (geomorphological) settings or features likely for being remotely sensed and tested if need be. The distributions of archaeological sites allows the researcher to better understand the times of human occupation coincident with lower base levels, as well as the kinds of sites and artifacts that might be expected in the project area.

The Port Everglades project area is in two sections, one lies offshore of Broward County, north and east of Port Everglades Channel and the other in the channel itself (see Figure 1-02). The continental shelf along this reach of Florida's coastline is extremely narrow, indicating little change of the onshore landscape extent as sea levels rose with deglaciation (Finkl and Andrews 2008). The depth of the channel survey area is around 40 feet (12 meters), and the ODMDS 650+ feet.

The Project Area is underlain by the Anastasia Formation, a deposit of last sea level high stand (Burdette et al. 2009). This formation was identified in the seismic record of Lydecker et al 2011, and by Finkl and Andrews (2008:833 and 835). The Anastasia Formation consists of sand and shell particles cemented by subaerial exposure. Optically Stimulated Luminescence (OSL) ages show two periods of formation: one around 100,000 years ago and the second around 80,000 years ago (Burdette et al. 2009); both occurred during lower sea levels.

Using laser airborne depth soundings (LADS) Finkl and Andrews (2008) and Finkl et al. (2008) built digital bathymetric models (DBM) from Palm Beach to Miami-Dade counties providing the basis for geomorphological interpretations of features offshore. This includes numerous shore-parallel ridges that overlie both karstified and coquinoid limestones that form the substrate for the Florida Reef Tract reef growth. These paleo-ridges were formed by previous barrier island and dune formations over multiple sea level high stands.

Sediment beds lying on the Anastasia Formation at the Project Area are post-inundational sand beds with dynamic depositional histories. Areas between offshore ridges are paleolagoons that are now filled with marine sediment (Finkl and Andrews 2008). There is no reporting of preserved pre-submergence deposits in these sediment beds. Sediment beds lying on the Anastasia Formation to the north in the Indian River lagoon have yielded Holocene ages (Bader and Parkinson 1990). This is to say there were no late Pleistocene or early Holocene deposits identified, only later sediments related to the initial phases of saltwater intrusion with sea level rise (middle Holocene age). The same is probably true for Biscayne Bay to the south of the Project Area. Either of these lagoonal systems (Indian River or Biscayne Bay) would be more likely targets for human occupation than the higher energy, paleo-beach line of the Project Area (James et al. 2010).

Because the Florida peninsula is considered a stable platform, global eustatic sea level data may be considered accurate for this area. Figure 2-01 shows global eustatic sea level indicators from Siddall et al. (2003). This eustatic curve indicates the channel project depth (40 feet; 12 meters) was transgressed around 6600 BP (7500 cal. BP). Balsillie and Donoghue (2004) compiled sea level data from the Gulf of Mexico showing 12 meters (40 feet) transgressed slightly earlier at

7000 BP (7900 cal. BP). Both curves indicate times when sea levels were higher than current, but these would not be of relevance to modeling submerged cultural resources. Higher stands indicate the need for people to move inland, away from the water (Donoghue and White 1994). The concern here is with regressed water levels and expanded land surfaces.

It should be noted that the ODMDS survey area, at over 600 feet deep, was never exposed land at any sea level, and potential for submerged prehistoric is nil. This fact precluded the employment of a subbottom profiler system during survey.

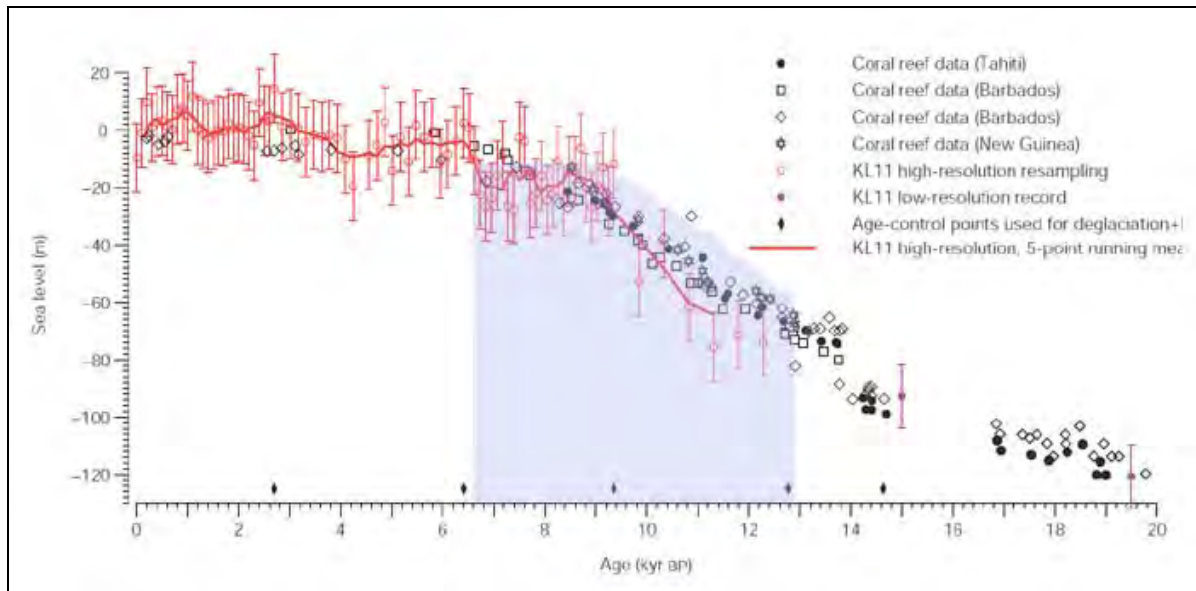


Figure 2-01. Siddall et al. 2003 worldwide, eustatic estimate with shaded area showing portion of the curve where the Project Area would have been exposed (40 feet; 12 meters).

PREHISTORIC CONTEXT

The earliest evidence for prehistoric native peoples in Florida dates back almost 12,000 years before the present. Prehistoric development in Florida can be divided into five periods: Paleoindian (10,000–7000 B.C.), Archaic (7000–1500 B.C.), Transitional (1500–500 B.C.), Three Glades (500 B.C.–A.D. 1566), and Contact (A.D. 1566–1763). Evidence for human occupation in Southeast Florida first appears during the Paleoindian period, between 9,000 and 9,500 years ago. This evidence was found at the Cutler Site in Miami, where side-notched projectile points were found in association with a hearth feature and animal bones (Carr 1986). During this time period and into the Early Archaic, South Florida was experiencing a drier, cooler climate than at present (Brooks 1974; Gleason et al. 1974). Lake Okeechobee and the Everglades did not exist, surface water was minimal and the coastline would have extended further than its present boundaries. The lack of water would have proved prohibitive to human life, save possibly in coastal areas. As such, the coastal sites one would expect from this period would most likely be inundated now due to the current higher sea levels (Milanich 1994: 302).

The likelihood of remotely sensing submerged remains is higher for archaeological materials from the Middle and Late Holocene (and possibly Middle and Late Archaic). It should be noted, though, that the distribution of Paleoindian and Early Archaic sites and artifacts is decidedly north and west of this region of Florida (Dunbar 1991). Moreover, the migratory character of the sand beds in the Project Area is not highly likely to preserve early sites (with the exception of the depth in the sediment column). Significant sites are more likely to be of the Late Archaic, given the local cultural historical reconstructions.

The Project Area is situated within the Everglades archaeological region or Everglades area, as defined by Griffin (1988, 1989) and Carr and Beriault (1984). Earlier assessments of cultural geography by Stirling (1936) and Goggin (1947) characterized much of southern Florida as the “Glades Area.” The diverse interior and coastal portions of the Everglades region were utilized extensively by prehistoric populations. Many small campsites are found on Everglades tree islands and larger sites are found in both coastal and interior areas. Hunter-gatherer subsistence activities focused on freshwater and marine resources, as well as the collection of edible plants. Material culture is characterized by a diverse toolkit of bone and shell implements, many of which are associated with weaving and woodworking activities. The distinctive decorated pottery of the Glades series is temporally sensitive and has been used to develop a 2,000-year chronological sequence (Griffin 1988, 1989). Complexes of middens and mounds, such as the one at the mouth of the Miami River, are characteristic of the settlement pattern for much of the coastal regions of the Glades Area (Carr and Beriault 1984; Wheeler 1992). Burial mounds are rare, but cemeteries within habitation sites are commonly encountered at coastal and inland Everglades sites (Felmley 1991). Given their proximity to the ever-changing sandy coastal shores, there is a possibility of finding some evidence of these habitation sites during the course of this investigation.

Ethnohistoric documents of the sixteenth through early eighteenth centuries reveal that the inhabitants of the Everglades region were known as the Tequesta, and the archaeological evidence indicates that the prehistoric peoples of the area were likely the ancestors of this historic period group. The Tequesta were not a simple band of hunter-gatherers. Close study of the ethnohistoric accounts indicates that their society was socio-politically complex. A major tribe with several subgroups, the Tequesta had political ties with other groups in the region, including the Ais to the north and the Calusa to the west (Milanich 1994). They subsisted primarily by hunting, gathering, and fishing, with a large portion of their diet composed of oysters and other shellfish, fish, turtles, palm berries, and sea grapes. Archaeology confirms that their economy was based on fishing, hunting, and gathering, with a reliance on dugout canoes, which were used along the coast and in the Everglades. Faunal remains from middens show that the Tequesta and their ancestors caught many types of fish, including large fish such as mako shark and swordfish (Griffin et al. 1982). Caches of shell celts suggest an honored role for makers of dugout canoes and other wooden objects (Carr and Reiger 1980). The Tequesta were expert wood carvers, as shown by two wooden clubs dredged from buried deposits, including one from the Miami River (Goggin 1942; Purdy 1991:236). These finds indicate the possibility of encountering other such artifacts in this investigation.

Historic accounts describe the Tequesta (Hann 1991; McNicoll 1941; Sturtevant 1978), who were encountered by Ponce de Leon during his first voyage to Florida in 1513 (Davis 1935; True 1944). In the 1560s, the Spanish established a fort and mission among the Tequesta, and they took the brother of the principal Tequesta chief to Spain, where he became a Christian. He returned to Florida and helped mediate between the Spanish and Indians (Lewis 1978; Solís de Merás 1923).

Like the Ais, their neighbors to the north, the Tequesta became proficient wreckers, recovering precious metals and other European goods from the numerous Spanish shipwrecks that occurred along the coast. Metal ceremonial tablets and other ornaments reworked from Spanish shipwreck materials are present in the geographical area indicating an interaction with people of the late Glades tradition early in Euro-American history (Goggin 1949). During this period, the Tequesta engaged in tributary and political relationships with neighboring tribes. The Tequesta were sometimes allied with their neighbors in the Florida Keys, and they used dugout canoes to hunt right whales, drying their meat for barter with inland groups (Goggin and Sturtevant 1964; Larson 1980; Worth 1995). Alliances were often cemented through marriages, and the chief of the Tequesta was a “near relative” of the chief of the Calusa, with whom the Tequesta were

sometimes allied and sometimes hostile (Goggin and Sturtevant 1964; Lewis 1978; Solís de Merás 1923).

The intent of this background discussion is to bring to light the types of cultural resources that may be present in the current Project Area. The sea level rise and landscape configurations throughout the region's existence plus the regional prehistory and history combined with known site locations allows the reviewers to extrapolate what they might expect to find during the survey.

Florida Master Site File (FMSF) data indicate that Paleoindian, Early Archaic, and Middle Archaic site distributions are decidedly north, with a few notable exceptions (Figure 2-02). One well-known early site somewhat nearby the Project Area is the Cutler fossil ridge (DA2001), which is characterized as an Early Archaic occupation site (Carr 1986), although Emslie and Morgan (1995) argue convincingly that the deposit is a carnivore den and not a human occupation site. Nevertheless, radiocarbon and diagnostic artifacts indicate the presence of Early Archaic people around this particular faunal subsistence catchment in the early Holocene. Another site, the Oakland Park Boulevard Site (BD2133, Survey # 2933), produced a Suwannee projectile point along with Glades ceramics and other artifacts, but this could represent an intrusive artifact rather than an indication of Paleoindian activities at that site.

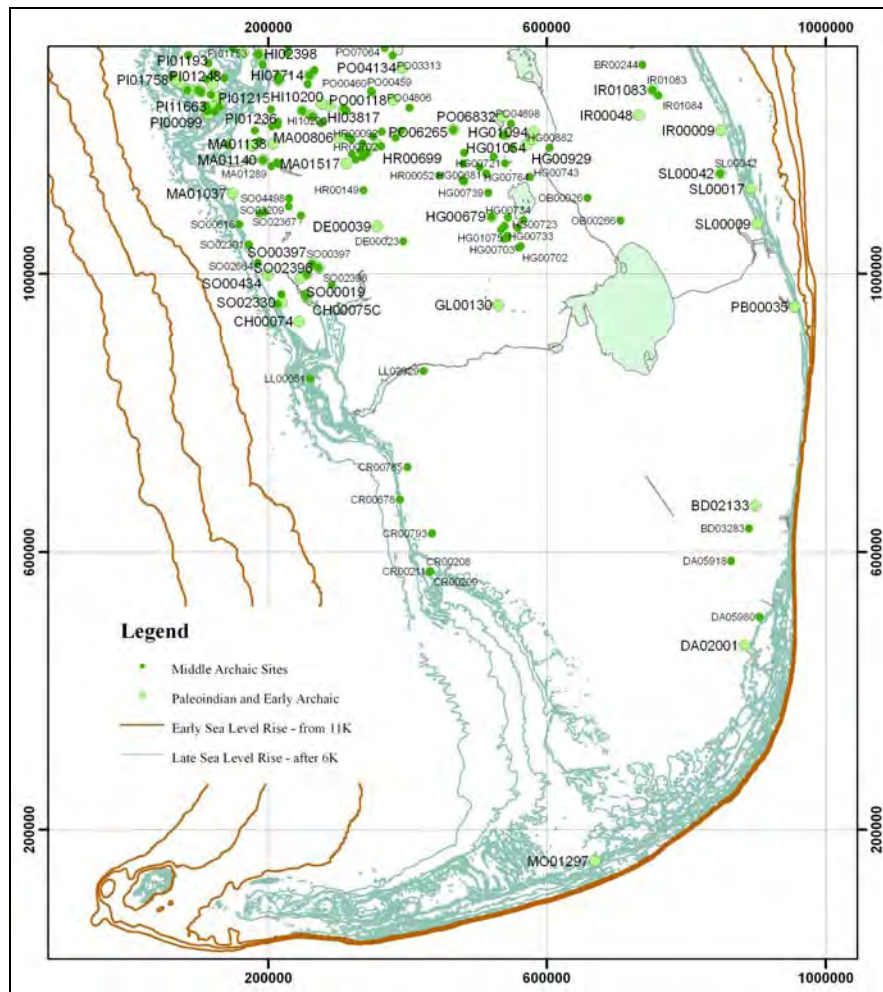


Figure 2-02. The lower half of the Florida peninsula and the distribution of Paleoindian, Early Archaic and Middle Archaic sites listed in the Florida Master Site File (FMSF). Note the gravity of the distribution of sites is decidedly north, away from the southern portions of the state, and the Project Area.

Three sites BD3282 (Hiatus #2, Survey #9168), DA5918 (Blockbuster #7, Survey #14983), and DA5980 (Banyan Circle, Survey #5583) are listed in the FMSF as having Middle Archaic aspects. These sites are inland and not relevant to coastal occupational evidence in Florida.

There is little likelihood of encountering submerged prehistoric remains from later Holocene occupations in the Project Area (i.e., Late Archaic, Transitional, and early Malabar or early Glades manifestations), with the exception of fish weirs or other organic features that would be difficult to remotely sense.

There are two submerged prehistoric sites known from the FMSF that attest to the potential for preservation of prehistoric sites in beach or near-shore settings. Middle Archaic Newnan points were found offshore of Douglas Beach (SL17) in sediments under the marine bed that also contained a shipwreck site (Murphy 1990). A ^{14}C age on a sharpened stake with a battered end from Douglas Beach was 4630 \pm 100 (I-13841) BP. More recently, Early Archaic and Paleoindian diagnostics have also been found at this site. The peaty deposits that these artifacts were found in would have a seismic expression and so would be detectable in the subbottom data.

The Cato site in Indian River County (IR0025; Bullen et al. 1968) is a shell midden located on the Atlantic side, buried by the modern beach deposits. The site was first exposed by a storm and later by trench excavation during low tide. Excavations indicated that the top of the midden was 2–3 feet below the 1968 beach surface. The site was fully submerged at high tide. Bullen et al. (1968) were unable to determine the elevation of the base of the midden, but they state that the ocean must have been at least 5 feet and possibly 10 feet (1–3 meters) lower than present level for this site to have been deposited. Oyster shells were dominant, with “bay species” included. The sand below the midden was described as black. Ceramics included St. Johns plain and four fragments of *Busycon* that returned a surprisingly recent radiocarbon age of 2795 \pm 50 BP (FSU-173). Whether the site was originally in the lagoon, on the western side of the barrier with the barrier transgressing, or if the site was east of the barrier were discussed, but not determined.

HISTORIC CONTEXT

Although the Spanish began to colonize Florida in the sixteenth century, their primary presence in southeastern Florida was the result of shipwrecks along the Atlantic coastline. Raiding parties of English colonists and Indians from Georgia and the Carolinas soon reached into Central and South Florida, capturing Indians for the slave trade (Davidson 2001). Many captured Florida Indians were sold into slavery in the Carolinas and in the English colonies in the Caribbean. When Florida became an English colony in 1763, many of the remaining native peoples, including some of the Tequesta, relocated to Cuba with their Spanish allies (McIver 1983). Britain found that when it gained control over Florida, there were no significant settlements in South Florida. Further, with the change in power from Spain to Britain, more than 3,000 colonists left the region. The English offered land grants to encourage settlement and a few plantations were established between 1763 and 1775 along the eastern coast of Florida; however, the outbreak of the American Revolution altered the development of British Florida (Schene 1976).

By 1784, Spain had recovered the Florida territory. The population of East Florida fell to under 2,000 with the departure of the British and the abandonment of numerous plantations. To encourage sustainable populations in Florida, the Spanish began issuing its first land grants in Florida to anyone who would swear an oath of allegiance to Spain, even if the parties were not Catholic (Tanner 1963). These first land grants were in what would become Indian River and Palm Beach counties, north of present day Broward County. As the eighteenth century came to an end and the nineteenth century began, the Seminole Indians were increasingly forced into

Florida by the United States to the north. In the early nineteenth century Spain's control over Florida was weak, and after the First Seminole War, Spain sold Florida to the U.S. (McIver 1983).

In 1821, Florida became a U.S. Territory and settlement of South Florida began. Although widely scattered and sparsely settled, these early settlements pushed the Seminole Indians further into Southwest Florida. The Fort Lauderdale area was known as the "New River Settlement" before the twentieth century. In the 1830s, there were less than 100 settlers living along the river that often traded with the Seminole Indians. During the Second Seminole War (1835–1842), many of the early settlers left the eastern coast of Florida following an attack by the Seminoles. Several battles were fought in Southeast Florida as the U.S. Army pushed the Seminoles farther into the Everglades and established posts including Fort Lauderdale in Broward County, Fort Jupiter in Palm Beach County, and Fort Dallas—now Miami (McIver 1983; Van Landingham 1988). The first U.S. stockade named Fort Lauderdale was built in 1838, offering reinforcement during the Second Seminole War. The fort was abandoned after the end of the war in 1842. Transportation along the eastern coast of Florida was most effective by coastal schooners, which were able to enter the shallow waters of the inlets and bays. Some settlers had their own schooners and traded with the Bahamas, Cuba, and the Florida Keys (Rights 1994). These groups lived a relatively peaceful existence until 1849, when many fled the area, because they feared a Seminole Indian uprising.

Before the Civil War, Florida supplied Cuba with cattle and later the Confederacy with beef. The cattlemen drove their herds along the line of forts built during the Seminole wars to the western coast for export (Rights 1994). The area along the eastern coast of Florida, including Broward County, was relatively peaceful during the Civil War. Blockade-runners who hid from the U.S. Navy had used the coastal waters to avoid capture (Van Landingham 1988). During and immediately after the Civil War, the eastern coast of Florida was only sparsely populated. Homesteaders began to arrive in increasing numbers in the late 1800s. During 1875–1876, the U.S. Life-Saving Service, one of the forerunners to the U.S. Coast Guard, established a series of Houses of Refuge and Life Saving Stations along Florida's eastern coast to offer relief to shipwrecked persons within this sparsely populated region. One of the first of these was the one constructed at the beach site of the old Fort Lauderdale (U.S. Coast Guard 2011). It was located approximately 7 miles north of the New River Inlet and its first keeper, Washington Jenkins of Biscayne Bay, Florida, was appointed October 7, 1876. The duties of the keeper included patrolling the coast in both directions from the House of Refuge after a storm to seek shipwrecked survivors in need of aid and a skiff was probably used in commission of these activities (Figure 2-03).

The Houses of Refuge also served another purpose during the years of 1885–1892. Mail delivery service along the eastern coast of Florida was handled during this period by men who came to be known as the Barefoot Mailmen for their custom of walking along the beach between Lake Worth in the north and Miami to the south. This walk took four days; during which the Barefoot Mailman covered 88 miles, stopping to rest and eat at the Houses of Refuge along the way, including the one at Fort Lauderdale. The beach route was one way of avoiding the thick vegetation of the interior of Florida, but it led to other difficulties, such as crossing the inlets and bays. One of these crossings proved deadly for mail carrier James Hamilton. It had been his custom to leave a small boat tied on one side of the Hillsboro Inlet, use it to cross south with mail, and then use it for his return trip crossing. On October 11, 1887 he arrived to find his boat moved to the opposite bank, so he attempted to swim the inlet and was either drowned or killed by dangerous marine life, sharks, or alligators being equally blamed. All that was found of him was his mail pouch and clothes left on the bank. In 1892, mail service moved to the stagecoach line that used the newly cut road paralleling the coast along the sandy ridges inland (Kepler 1974; Butler 1995).



Figure 2-03. Skiff from the Fort Lauderdale House of Refuge, circa 1905 (courtesy of the State Library and Archives of Florida).

Before the twentieth century the area around old Fort Lauderdale was populated by a few homesteaders and Miccosukee Indians. The Miccosukee Tribe had inherited the Everglades after the end of the Third Seminole War in 1858. Frank Stranahan, one of the early settlers in the area, established a camp in 1893 where he could trade with the Indians. In 1900, he married the first schoolteacher sent to the area, Ivy Cromartie. Shortly thereafter, in 1901, Stranahan built a more permanent trading post and a house for his family on the New River (Kersey 2003). The Stranahan House still stands and is utilized as a museum.

Meanwhile, development further to the north on Florida's eastern coast had been thriving after the construction of the Flagler System of railroads. In the mid-1890s, Flagler's railroad reached only as far south as Palm Beach; however, the freeze of 1894–1895 led to the extension of the railroad further south to Miami, through Pompano and Fort Lauderdale. Julia Tuttle was also instrumental in convincing Henry Flagler, the builder of the railroad, to extend his railroad from its terminus in West Palm Beach to Miami (Harner 1973). Thus a railhead for the Florida East Coast Railway arrived in Fort Lauderdale in 1896. The railroad spurred the development of Fort Lauderdale and many small towns along the route (McIver 1983).

In 1890, the completion of the Pompano portion of the East Coast Canal, now a part of the Intracoastal Waterway, linked communities from Jupiter to Biscayne Bay and opened up the water as a safer means of transportation (Cavaioli 2001). The initial growth of eastern Broward County and Fort Lauderdale was also sparked by the presence of the New River that flowed from west to east into the Atlantic and the small commercial enterprise created by Frank Stranahan. In 1906, Stranahan built a two-story department store on the New River, just west of the present

Andrews Avenue Bridge. Fort Lauderdale grew around this store and spread to the southern side of New River as soon as a bridge was built (Gore 1996).

After Napoleon Bonaparte Broward became governor of Florida in 1905, he championed efforts to drain the Everglades, creating more arable land in South Florida. The first major drainage canal (North New River Canal) was built from the southern fork of the New River to Lake Okeechobee, and was completed in 1912. This canal was the centerpiece of the state's drainage program and opened the Everglades to farming. A boom trade developed with lakeside communities, as boats carried produce, fish, and passengers east towards Fort Lauderdale. Many docks and packinghouses were built along the river to handle the heavy barge traffic (McIver 1983). By 1912, enough people lived and farmed in the area to make Fort Lauderdale one of the largest vegetable shipping ports in the country (Gore 1996). This growth occurred as a direct result of the Everglades Drainage District project that commenced in 1906. Although it almost destroyed the Everglades watershed, the project dredged and drained the "sea of grass," built canals and locks, and opened thousands of acres of virgin land to settlement and cultivation (Boone 1988).

Spurred by the growing popularity of the Good Roads Movement throughout the Southern United States, construction of a portion of the Dixie Highway began in Florida in the early twentieth century. In the 1910s, road construction in Broward County was limited to the Atlantic Coastal Ridge. The Dixie Highway was originally conceived as a 5,706-mile long roadway project stretching from Ontario, Canada to Miami, Florida, built to respond to the growth of automobile tourism in the early 1900s (Sharp 2002). The Dixie Highway, which became U.S. Highway 1 within Broward County with the adoption of the modern highway numbering system, in addition to further opening the county to automobile tourists also improved the truck farming industry. By 1939, U.S. Highway 1 was the major north-south route along eastern Florida (Kendrick 1964; Thuma 2005). South Florida was experiencing its first land boom and thousands of new residents arrived each week, many coming to some of the earliest communities springing up in Broward County: Fort Lauderdale; Hollywood; and Pompano Beach.

FORT LAUDERDALE

Fort Lauderdale was officially incorporated as a city in 1910 and had a population of only 143. The first bridge to cross New River, other than the railroad bridge, was a low-rise truss built in 1910 near Andrews Avenue. As a sign of the future of tourism in Fort Lauderdale, a tourist camp quickly sprang up on the southern side of the river. Another sign of growth was the establishment of a newspaper in 1911. Settlement continued to focus along the coast and rivers, as boats were the primary means of transportation. The newer arrivals were more likely to settle in the interior of the county, where land better suited for agriculture had been made available as a result of the drainage projects (McIver 1983). In 1915, Broward County was separated from Dade County.

Fort Lauderdale grew quickly during the Florida Land Boom of the 1920s. As Fort Lauderdale had originally been built on the New River rather than on the coast, there was an eastern expansion toward the ocean. Las Olas Boulevard, originally called Broward Boulevard, began as a residential street. The street dead-ended in downtown and the eastern terminus was the East Coast Canal (now called the Intracoastal Waterway). Investors Stranahan, the Bryans, the Olivers, W.C. Kyle, and Fred Barrett agreed to construct a bridge using property from D.C. Alexander designating the road and adjacent subdivision "Las Olas by the Sea." In January of 1915, the Las Olas Bridge Company gained \$15,000 for completion of the road. After two years of the road still not being completed, there were notions of strained relationships between developers who had set their sights on this stretch of property. As surrounding communities expressed their interests of having ocean access, Broward County passed a bond issue of \$400,000 to build bridges. A 1-mile long stretch of dense mangrove swamp that separated the

mainland and the width of the bay proved to be an obstacle for builders. Companies from Mansfield, Ohio Champion Bridge Company took the challenge and built the single lane, turn style bridge of Las Olas Boulevard and completed it in January 1917 (Kersey 2003).

Charles G. Rodes, from West Virginia, arrived in Fort Lauderdale before 1910 and is credited with bringing the “finger-islanding technique” used in Venice, Italy to Fort Lauderdale. A businessman who had invested in real estate, he purchased land from the Beverly Heights Syndicate east to the Intracoastal Water Way and a mangrove swamp to the south for \$400 an acre. The method kept costs low by using a land based dragline that dredged a series of parallel canals from Las Olas to the river building up long, thin land masses (McIver 1983).

By 1925, the town’s population had expanded to 15,915 people. New subdivisions were spreading in all directions from downtown. Beverly Heights was a boom time subdivision built along the Himmarshee Canal. The canal, dredged in the 1920’s, got its name from the Miccosukee word meaning “new” for the New River located to the south (Gillis 1999). The Fort Lauderdale area became a business and banking center for South Florida as the real estate boom reached its peak in 1925 (McIver 1983).

In the fall of 1926 disaster struck. A massive hurricane hit the southeastern coast of Florida, destroying almost everything in its path. Fort Lauderdale, along with much of the eastern coast of South Florida, was destroyed. This helped to usher in the real estate collapse. People fled north, selling off or abandoning their lands and homes in South Florida. The stock market crash of 1929 only exacerbated the problem and the Great Depression hit Florida very hard.

It was not until the beginning of World War II that things started improving for Fort Lauderdale. The U.S. military decided that Florida was the ideal location to train troops and established training bases all over the state. The Fort Lauderdale Naval Air Station was built in 1942 and naval training schools and gunnery ranges were established elsewhere in the county. The defense spending in the county helped to offset the loss of tourism dollars, as rationing kept many people from traveling to Florida for vacations (McIver 1983). Some resort hotels were converted into military housing (McGoun 1972). The population nearly doubled during this time as the military created new jobs. After the war many servicemen who had trained in the area returned with their families, causing the population to rise exponentially.

The postwar period population influx brought resurgence in development to Fort Lauderdale. New subdivisions and towns were created, and improved flood control opened up more land in the western portions of the county for real estate development. In the 1960’s, development began to shift toward the construction of oceanfront condominiums and retail establishments (Cavaoli 2001). Because it is a larger metropolitan area and because of its proximity to the beaches, Fort Lauderdale relies on tourism and real estate development for its continued growth. The biggest attractions for the area continue to be mild winters, and good fishing and boating opportunities provided by the Atlantic Ocean and the Intracoastal Waterway.

HOLLYWOOD

The boom years of the 1920s brought an influx of land speculators and real estate tycoons to Florida, among them Joseph Young. His Indiana-based real estate company came to Miami to capitalize on the land rush and to look for the ideal location for Young’s “dream city.” In 1921 he found his spot just north of the already established city of Fort Lauderdale and began the purchasing, planning, and construction process almost immediately. Hollywood Boulevard was his centerpiece: a large, wide avenue stretching to the sea with three large circles to contain parkland along it. According to his design, everything else was to be built off this axis. Streets to the north and south of this grand boulevard were given the names of former Presidents.

In less than five years his vision had been fulfilled. In 1925 the city of Hollywood was officially incorporated. By the beginning of 1926 Hollywood had over 2,400 houses and approximately 18,000 residents with more moving to that spot on the coast every day (Roberts 2002). New housing developments were opened up in the Hollywood Hills section as expansion of the city progressed westward. Young, Inc., Joseph Young's development corporation, used a payment plan method of home ownership, enabling families who lacked the funds to buy a new home outright and move in immediately, thus fueling the city's rapid growth.

However, the boom soon turned to bust for Hollywood the same as it had for Ft. Lauderdale when the 1926 hurricane hit. Thirty-seven residents of Hollywood were killed, trees were uprooted and the power lines were blown down. Hollywood was devastated and all new growth came to a halt. Many residents, frightened by this unexpected down side to paradise decided to sell their homes for whatever the market would yield and leave. Almost overnight Hollywood's population dropped from near 18,000 to just under 2,500 (Roberts 2002). The stock market crash of 1929 compounded the problem, ushering in the Great Depression. In 1930, Young's development company went bankrupt and the sheriff auctioned off his holdings.

It was not until the beginning of World War II that things started to improve for Hollywood. The U.S. military decided that Florida was the ideal location to train troops and so bases were set up all over the state. The Hollywood Beach Hotel was converted to the U.S. Naval Indoctrination School and the local military academy was transformed into the U.S. Naval Air Gunner's School (TenEick 1989). The population nearly doubled during this time as the military created new jobs. After the war many who had trained in the area during the war later returned with their families, causing the population to rise exponentially.

Hollywood has remained closely associated with Fort Lauderdale, its larger neighboring city to the north, and in many ways has shared in the same boons and busts. Similarly, the biggest attractions for Hollywood continue to be mild winters, good fishing and boating opportunities provided by the Atlantic Ocean and the Intracoastal Waterway.

POMPANO BEACH

Pompano Beach is the second oldest city in Broward County and fifth in south Florida. It came about in 1896 like many other South Florida towns that sprung up along Flagler's Florida East Coast Railway. Settlers originally occupied an area around Lettuce Lake, which is now known as Lake Santa Barbara. Farmers began to move west to take advantage of the railroad corridor and a small commercial district grew around the depot. M.Z. Cavendish opened the first general store in 1900 at NE First Street and Flagler Avenue.

The small, modest farming community that began with pineapple farmers, were competing with Caribbean growers and later switched to winter vegetables such as tomatoes, beans, and peppers which yielded higher profits. The town, originally within Dade County, became incorporated in 1908 with John R. Mizell elected as the first mayor. The next year Palm Beach County established its southern boundary at the Cypress Creek Canal. In 1915, Broward County was founded with a northern boundary at the Hillsboro Canal. In the seven years following its incorporation, Pompano volleyed between three counties.

The name "Pompano" is rumored to have come from a note made on a survey map by Frank Sheen after dining on the fish and wanting to remember its name. As Florida's economy and population grew after World War I, Pompano was not as affected by the Florida land boom. New developments did get platted, but were never built. The largest development during this time was a racetrack southwest of town. Costing more than \$1,000,000, capable of holding 6,000 people, and able to board 1,000 horses, it closed down after a few days of racing when the State of Florida deemed gambling illegal.

William L. Kester, a managing director of Westinghouse's Cooper-Hewitt Lamp Company made his fortune selling heavy equipment during World War I. He then retired to Pompano in 1923. Originally lured to South Florida for the fishing, he became a major force in the economic and social development of Pompano (McIver 1983).

In 1931 when Pompano's only bank, the Bank of Pompano, closed, Kester purchased the bank's furnishings, buildings, and land from federal liquidators and provided half the capital for a new venture. After two years, the new Farmer's Bank of Pompano opened (McIver 1983). Kester also helped form the town's first Chamber of Commerce, and donated land for a public library and park that would later be named in his honor. Much of today's public beach was sold to Pompano by Kester at a discounted price. During a time when new construction halted, Kester is best known for the rental houses he had constructed during the 1930s on the beach and in Pompano. These wood-framed structures, built from Dade County pine, which Kester described as "pepper crates," rented out for \$25 a week on the beach. The Kester Cottages provided employment for local workers, a means to attract tourists to the area, and provided housing to local residents (McIver 1983).

Throughout the Depression agriculture flourished and downtown Pompano thrived with farmers, brokers, railway agents, and local residents making sure crops got to market. In 1939, the Pompano State Farmers Market opened west of town along the Seaboard Airline Railroad tracks. With a loading platform over 1,000 feet long, it was the longest one of its time. After World War II, Pompano Beach, like much of South Florida, entered another population expansion. In 1947, the City of Pompano merged with the newly formed municipality on the beach and became the City of Pompano Beach. Subsequently other areas surrounding the city were annexed, although a few sought-after areas, such as Lighthouse Point and Coconut Creek, incorporated rather than join Pompano Beach.

MARITIME CONTEXT

The coastline that would become Broward County had been an empty wilderness in the early historic time period. Low-lying with no visible landmarks, southbound ships hugged the coast to avoid the northward flowing Gulfstream and northbound ships in the grip of large storms, such as hurricanes, often found themselves in peril, and many of these ships were wrecked just off the coast of South Florida.

While the area's coastline would be the scene of numerous wrecks throughout the eighteenth and nineteenth centuries, the waters between the barrier islands and the shore were less traveled early on due to the shallow and changeable nature of the natural inlets, the most prominent being the Hillsboro Inlet. Historically, this inlet was relatively small and unpredictable with dangerous shifting shoals and bars. There was also the Indian Haulover, which crossed the narrow New River Sound from the Atlantic to Lake Mabel, connecting to the New River. In the past, the shallow depth of the Intracoastal Waterway, New River Sound, and Hillsboro River also limited the size of vessels that could ply the waters.

Although mostly undocumented in the written and photographic record, schooners of various sizes must have played a significant role in transportation and commerce in the area prior to and after the advent of steam. Better documented, the steamboat served the coastal communities of Broward County. These were used for transportation of passengers and freight. The *Suwanee*, a stern-wheel passenger and freight steamer, was frequently in the Broward County Area and on the New River (Figure 2-04; Broward County Historical Commission 2011b). Felix A. Forbes purchased the stern-wheeler *Henry Diston* to operate out of Fort Lauderdale for trips to Moore Haven via Okeechobee (Florida Herald 1918). As there was no access to the beach in Fort Lauderdale from the land prior to 1917, steamboats like the *Okeechobee* were used to travel up to the Hillsboro Inlet and out to the beach (Fort Lauderdale Historical Society 2011). The

Quaker Line, with the *S.S. Angelo*, had the distinction of being the first steamship line in Port Everglades. It began service there in 1938 and carried passengers and freight along the Intracoastal Waterway (Eller 1971).

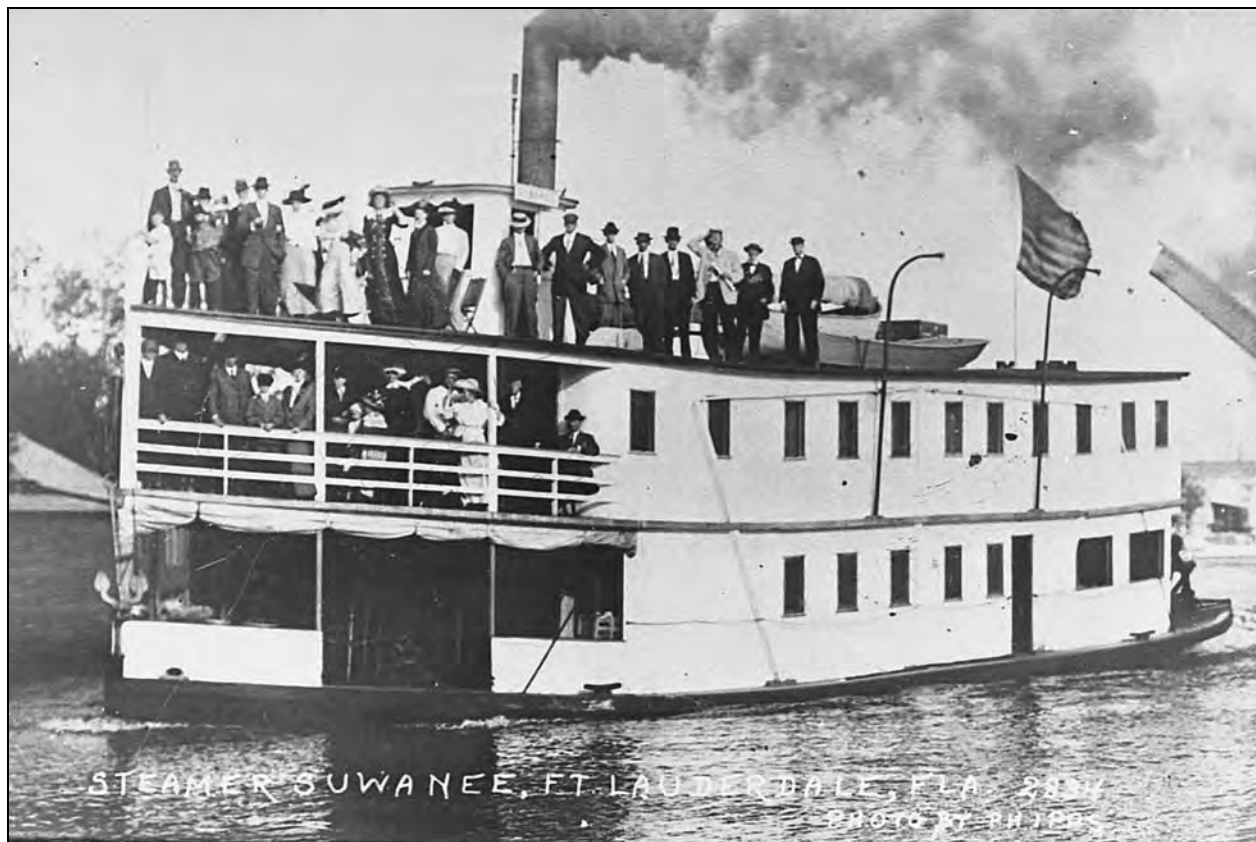


Figure 2-04. *Suwanee*, a stern-wheel passenger and freight steamer in Fort Lauderdale, circa 1912 (courtesy of the State Library and Archives of Florida).

Fort Lauderdale had the added water attraction of many different boat tour lines. Freeman's Tours, one of the original sightseeing tours, operated two yachts on the New River: *Kathleen* and *Sea Gull* (Broward County Historical Commission 2011b). F.R. Albury had originally purchased the pleasure yacht *Kathleen* from railroad magnate Henry Flagler, made some changes to it, and set it up for passenger transport between Fort Lauderdale, Fort Myers, and Moore Haven (Florida Herald 1920c). The *Margie M.* and *N.B. Broward* were small boats offering local trips (Broward County Historical Commission 2011b). The *Abeona* and the *Jungle Queen* (I, II, and III) were just a few of the better-known "Jungle Cruise" outings offered in the Fort Lauderdale area. Captain Harry Kestner operated the *Abeona* and his tours, begun in 1924, boasted a 3-hour round trip excursion to see Seminole Indians, an Indian Village, jungles, alligators, orange groves, and the island estates of the wealthy (Figure 2-05). According to a 1935 article, the *Abeona* carried 2,556 passengers in season (Fort Lauderdale Daily News 1935).

• PHOTOGRAPHING •

The following are only a few of the many points of interest seen on The ABEONA SCENIC ROUTE.

- Mysterious New River
- Pan American Jungle Park
- Lauderdale Yacht Club
- U. S. Coast Guard Base
- Venice
- Isle of Palms
- Royal Plaza
- Coral Isles
- Coral Way
- Jungles
- Whirlpool
- New River Groves
- Lido Drive
- Rio Vista Isles

and
BEAUTIFUL ISLAND ESTATES




Photo taken from the Deck of the "ABEONA" while Cruising Through the Jungles.

DON'T BE MISLED
See That Your Ticket Reads
"ABEONA SCENIC ROUTE"
Since 1924

As our license limits us to a limited number of passengers, it is advisable to make reservations early. If for any reason, you cannot make the trip, your money will be refunded if ticket is returned one hour before sailing.

Safety, Courtesy and Service is our Motto.


DEPARTS 2 P.M. WEEK DAYS
SUNDAYS 10:30 A.M. and 2 P.M.

May we meet on the Abeona?
We thank you,
CAPT. HARRY KESTNER.

• THE SCENIC ROUTE •

THE SIGHTSEEING BOAT
ABEONA
FLORIDA'S
PREMIER
3
HOUR
JUNGLE CRUISE

SEE SEMINOLE INDIANS
THE SCENIC ROUTE



From the Everglades to
the New River Sound

SEE SEMINOLE INDIANS

SAILS FROM CITY DOCK No. 1
NORTH End Andrews Avenue Bridge
RESERVATIONS AT DOCK
(PARKING AT THE DOCK)

THREE HOUR TRIP --- \$1.00 Plus Tax 10c

DEPARTS 2:00 P. M.
SUNDAYS—10:30 A. M. and 2 P. M.

Figure 2-05. Brochure for a sightseeing cruise aboard the *Abeona* (courtesy of the Fort Lauderdale Historical Society).

Tourism also brought sightseers with their own boats to Broward County. Captain and Mrs. Weaver of the Betsy Ross Flag Company wintered in Fort Lauderdale, having sailed their yacht, *San Sui II*, from Long Island, New York to Las Olas Sound. They also brought their high-speed motorboat *Sweetheart* with them; it proved to be one of the largest and fastest in the area at the time (Florida Herald 1921). Yachts were readily available for hire. The yacht *Kylo* was brought by A.H. Brook of Brooklyn, New York to Fort Lauderdale, along with another boat, to meet the demand for pleasure and fishing boats (Florida Herald 1920a). Houseboats, such as the stucco houseboat *Coquina II*, built by Ralph E. Steel for Mr. and Mrs. H.L. Woodburn, could also be found in Fort Lauderdale (Florida Herald 1920b). A ship even served as a hotel for a time in Fort Lauderdale. The *Amphitrite*, which began in 1890 as a U.S. Monitor until it was decommissioned in 1924, was refitted in 1926 as a floating hotel. It operated in Beaufort, South Carolina and Hemstead, on Long Island Sound, before moving to the New River in Fort Lauderdale in 1931. It lasted for just over a decade as a unique and sophisticated place to stay

before sailing away again (Fort Lauderdale Daily News 1931; Fort Lauderdale Free Press 1937; Boston Post 1940).

In 1950, Gray Line boats, *Nikko* and *Martha Washington*, traveled the Intracoastal Waterway between Hallandale and Hollywood (Broward County Historical Commission 2011b). Also beginning in 1950 and continuing until 1965, *Miss Gateway* was the passenger ferry from Port Everglades along the Intracoastal Waterway to the beaches. As many as 5,000 people a day were transported on busy weekends aboard the boat that's seating consisted of folding lawn chairs. Ferry service was discontinued when a paved road was added to the once sandy barrier island for beachgoers (Almond 1965).

INTRACOASTAL WATERWAY

The shallow depths of the coastal waters of Florida and the sandy barrier islands have historically limited the size of vessels that could be navigated along its course. Recognizing the importance of drainage and dredging to making land useful for farming, both the federal and state governments passed several acts relating to the improvement of waterways. On September 28, 1850 the U.S. Congress approved what was commonly called the Swamp and Overflow Lands Act. It transferred large amounts of land to the states in order for them to oversee drainage and improvements that would facilitate development and settlement. On January 6, 1855 the Florida Legislature passed an act to provide for and encourage a liberal system of internal improvements within the state. These lands granted the state by the federal government would later be leveraged for navigational improvements, but not until well after the intermission the Civil War and subsequent Reconstruction caused (Butler 1995).

In 1881, the private Coast Line Canal and Transportation Company was chartered to dredge a channel along the coast between the shore and the barrier islands (Figure 2-06). Land was used to pay for their work. Dredging began in 1883 on the portion from St. Augustine to Daytona. In the early 1890's the canal had reached the Hillsboro Inlet. In 1914, the canal was completed and stretched from the St. Johns River in Jacksonville, south to Biscayne Bay. Work had proceeded in several parts and to minimize cost and effort, existing bays and waterways had been utilized. As originally commissioned, the canal was 50 feet wide, 5 feet deep, and 340 miles long. The deal that had been made granted the Coast Line Canal and Transportation Company a certain amount of acreage in Florida for every mile of canal dredged. Revenue was also to be raised from tolls to boaters using the canal. Between 1896 and 1914 only \$7,289.00 was collected. This lack of expected toll monies coupled with constant maintenance problems due to shoaling and shifting sand, caused the company to change hands several times. Flagler and his East Coast Railroad even owned the canal briefly when it received it in exchange for debts. In 1923, it went into receivership (Bland and Johnston 1998; Crawford 1997; Butler 1995).

The canal was purchased from bankruptcy with state funds. Then the federal government assumed control of it in 1927, and the Florida Inland Navigation District was created. With the passage of the River and Harbors Act of 1927, work intending to deepen and widen the channel took place on the East Coast section of the Intracoastal Waterway. Between 1950 and 1965 efforts continued to widen and deepen the channel, with a goal of a minimum width of 125 feet and a minimum depth of 10 feet (Butler 1995).



Figure 2-06. Undated photo of a dredge in operation on the East Coast Canal (courtesy of the State Library and Archives of Florida).

HILLSBORO INLET

One account of the Hillsboro Inlet, before it was settled, comes from the memoirs of Charles William Pierce. His father, Hannibal Pierce, was the Jupiter Inlet Lighthouse keeper and later the keeper of the Lake Worth House of Refuge. He told of sailing along with his family in their vessel, the *Creole*, along the coastline of Florida from Lake Worth to Miami. Bad weather forced them ashore and they camped for several days at the Hillsboro Inlet. Charles Pierce wrote of exploring the palm-covered inlet's shores while they awaited favorable weather for sailing (Broward County Historical Commission n.d.; Pierce 1970). In 1884, the U.S. Coast and Geological Survey Expedition was tasked with mapping the East Coast of Florida. Aboard the sloop *Steadfast* they sailed the coastline painstakingly mapping and surveying. The following year, their work was plotted and detailed maps were produced. In 1886, the maps produced by their survey were verified (Butler 1995).

As boat traffic increased along the coastline, it became evident that a lighthouse was necessary for navigation in the vicinity of the Hillsboro Inlet. In 1907, the Hillsboro Lighthouse, a steel frame structure, was erected (Figures 2-07 and 2-08). It had originally been an exhibit from the Chicago World's Fair, Colombian Exposition of 1893, but was disassembled and relocated to Florida. Other improvements to the inlet followed in 1930, when a rock jetty was constructed to the southeast of the lighthouse, and again, in 1952, when a 500-foot timber jetty was added to the southern side of the channel for stability (McAllister 1994).

The Hillsboro Inlet has proved changeable over the years, as littoral drift, storm surges from hurricanes, and major flooding from the mainland opened, closed, narrowed, or moved the inlet. Accounts of early commercial fishermen and charter boat captains' efforts to maintain the inlet are as muddled as their efforts must have seemed. Various these volunteers dug by hand, employed mule teams, or used their propellers at low tide to maintain the opening (Butler 1995).



Figure 2-07. 1936 Aerial Photograph of the Hillsboro Inlet and Lighthouse (courtesy of the State Library and Archives of Florida).



Figure 2-08. Aerial Photograph of the Hillsboro Inlet, circa 1942 (courtesy of the State Library and Archives of Florida).

The jetty constructed in the summer of 1952 had caused sand to accumulate in the channel. Less than a year later, occasional volunteer effort was not sufficient to keep the inlet navigable for the number and size of vessels utilizing it. The community and local government partnered together to dredge the inlet. The project cost \$14,000, with \$7,500 of the funding coming from the City of Pompano Beach and the remainder raised through the American Legion and local boaters and businesses. The dredging was completed in February of 1953 under the supervision of the Hillsboro Inlet Improvement Association. The channel exceeded 20 feet in places and a hazardous coral reef running south in front of the inlet was cleared to a depth of 8 feet (Ciccone 1953). In 1959, the Legislature of the State of Florida created the Hillsboro Inlet Improvement and Maintenance District (HIIMD) and the government now had a role in keeping the inlet navigable (McAllister 1994). The budget for the maintenance of this inlet was small and only afforded part time dredging. In 1965, construction improvements began again on the inlet. A 200-foot curved jetty was to be added to the north, a 400-foot jetty to the south, dredging a channel to 12 feet deep, and the cutting of a new inlet at an angle for safer navigation were all proposed improvements. Despite all these, constant dredging was still necessary, especially in the winter months. In 1996, Captain Woodward “Woody” Draughton was the dredge supervisor of the HIIMD, which was still a very small, government-funded agency. He worked constantly to keep the channel 8 feet deep, clear, and navigable (d’Oliveira 1996).

PORT EVERGLADES

As the largest deepwater port on the Atlantic south of Norfolk, Virginia, Port Everglades grew from the dreams and plans of Florida’s boom years of the early twentieth century. The Florida Board of Trade first called for a deepwater shipping port in 1911. Two years later the Fort Lauderdale Harbor Company was formed with the purpose of cutting a channel through the narrow sandy barrier island separating Lake Mabel from the Atlantic Ocean. This area, called the Indian Haulover, can be seen in a 1924 aerial photograph (Figure 2-09). Lake Mabel was ideal for a port, as it was originally 2,700 feet long and 3,400 feet wide (Everglades Port Authority 1978). There was still a need for a better inlet, as the cut was unstable. Joseph W. Young, the real estate developer, founder, and mayor of the City of Hollywood, advocated a deep-water port for Broward County. In 1924, he took action to insure its creation by purchasing over 1,400 acres of land adjacent to Lake Mabel. He also incorporated the Hollywood Harbor Development Company. Two years later the project was progressing and funds were needed for the construction project. Two million dollars in bonds were proposed, half to be secured by the City of Hollywood and half by the City of Fort Lauderdale. On June 10, 1926 the City of Hollywood voted in favor and several months later, on August 3, Fort Lauderdale also voted in favor (Port Everglades 2011; Fort Lauderdale Daily News 1929).

In 1927, the Florida Legislature created the Broward County Port Authority. Col. E.N. Johnson designed the port being constructed. The steel piles were from the Royce Kershaw Company of Jacksonville and the dredging work was being completed by the dredge *Hurricane* of the Tropical Dredging Company, one of Young’s many enterprises (Eller 1971). Updates on the construction work were frequently reported in the local newspaper. By October 1927, 47% of the dredging was done in Lake Mabel and 20% of the dredging in the inlet or entrance to the port was completed. The budget for the port construction totaled \$6 million. In January 1928, the port was opened to vessels of 18-foot draught. The 1-mile channel to the slips was dredged to 25-foot depth, while the turning basin was 30 feet in depth, and the channels to the berths were 31 feet in depth (Fort Lauderdale Daily News 1927).



Figure 2-09. 1924 Aerial photograph of Lake Mabel prior to the construction of Port Everglades (courtesy of the State Library and Archives of Florida).

A large celebration was planned for the official opening of the port. Washington's Birthday, February 22, 1928 was chosen for the big day. Schools and business closed at noon so that close to 85% of the population of Broward County could attend. Airplane stunts, a parachute jump, transportation across Bay Mabel to watch the opening, and refreshment stands were all part of the festivities. The culmination was to be President Coolidge in Washington, D.C. turning a golden key that would complete a circuit thus triggering the explosion to clear the last section of sand separating the new port from the Atlantic (Fort Lauderdale Daily News 1928). Unfortunately, the charges failed to detonate—technical difficulties were later blamed. This newly opened port was variously called Bay Mabel Harbor and Lake Mabel Harbor. Young had advocated for naming it Hollywood Harbor, but officials thought that would be unfair to Fort Lauderdale, which had been an equal participant in the initial bond issue. Moreover, the port was located between the two cities. A contest to name the port was initiated and Port Everglades was chosen shortly after it was opened (Eller 1971; Port Everglades 2011).

The port was open for business (Figure 2-10). In 1929, railway connections were made to the Florida East Coast Railroad. This was a major accomplishment, as it united the two major forms of transportation. The first foreign flagged vessel to arrive in the port was the 7,000-ton capacity German cargo ship *S.S. Vogtland*; it arrived August 8, 1929 with a shipment of steel. Two

important businesses chose Port Everglades for their shipping needs in 1931. First, the United Fruit Company chose Port Everglades for two ships with its cruise line: *Talamanca* and *Pastores*; then, the Aeroland Oil Company began an oil pipeline in connection with Port Everglades. Aeroland's tanker, the *S.T. Huguenot*, first called in the port January 12, 1932, carrying 20,000 gallons of fuel for storage and distribution from the port. Standard Oil Company and Belcher Oil Company followed Aeroland Oil Company. One year later the port was graced with a visit by the largest U.S. cruise ship of that day, the *S.S. Columbia* of the Panama Pacific Line. By 1939, the U.S. Coast Guard had permanently stationed vessels in Port Everglades, some of which occasionally performed tug duties (Eller 1971; Port Everglades 2011).

Over the years, the port underwent many changes and improvements. As early as 1930 Congress had allocated \$40,000 a year for the maintenance. By 1931, plans called for the federal government to fund 3.5 miles of connecting rail lines between the Seaboard Air Line Railroad and the Florida East Coast Railroad, a 200-foot wide and 35-foot deep entrance channel, 27,000 linear feet of berths, a 1,200-foot wide and 35-foot deep turning basin, and an all steel warehouse (Everglades Port Authority 1978). In 1936, the House of Representatives passed an appropriations bill that allocated \$1,134,000 for this purpose (Fort Lauderdale Free Press 1936). Several decades later, President Eisenhower signed a bill appropriating \$6,683,000 for deepening the channel and turning basin yet again. This work was advocated by the USACE (Fort Lauderdale Daily News 1958). The bill was signed July 1958 and dredging was carried out the following summer (Fort Lauderdale Daily News 1959). In July of 1981, the USACE initiated another dredging project within Port Everglades with the purpose of deepening the turning basin from 44 feet to 49 feet. Canonie Offshore, a Michigan company, was hired to perform the dredging (Mellowitz 1983).



Figure 2-10. Detail from a brochure for Port Everglades, circa 1931 (courtesy of the Fort Lauderdale Historical Society).

During World War II, Port Everglades had served as a military base for the U.S. Navy. After the war, when shipping declined, the port diversified. In the 1960s, 27 new berths were completed. Also during this decade, the bulk of the materials passing through the port were petroleum and building materials (wood, steel, and cement). Around this time, Port Everglades gave itself the title “Hub of Winter Cruise Activity for the South Atlantic” (Everglades Port Authority 1978). Cruise lines have continued to frequent the port.



Figure 2-11. 1937 Photograph of the cargo ship *San Mateo* being loaded with produce at Port Everglades (courtesy of the State Library and Archives of Florida).

PREVIOUS INVESTIGATIONS

One of the best tools for accurately assessing the potential for unknown submerged cultural resources is to compare the Project Area with findings and results of previous investigations, including both remote sensing and cultural resources surveys that have been completed in or near the Project Area. Varying in degree of applicability to the current research, these studies allow for the identification of potentially significant resources, and the studies aid in the recognition of specific problems or aspects inherent in the assessment of the present survey data and in the identification of potential resources.

In order to ascertain the presence of submerged archaeological sites and investigations in or adjacent to the Project Area, the FMSF was reviewed. The review indicates that only 12 submerged cultural resources investigations have been conducted within 20 miles of the Project Area (Table 2-01). The types of projects and locations vary and are summarized below.

Table 2-01. Previous Submerged Cultural Resources Investigations.

FMSF No.	Title	References
1335	<i>John U. Lloyd Park: Offshore Sand Investigation</i>	CP&E, Inc. 1986
2099	<i>Hollywood/Hallandale Beach: Beach Renourishment Project, Broward County, Florida</i>	CP&E, Inc. 1989
4838	Submerged Historic Properties Survey, IWW Bakers Haulover, Dade County, Florida	Tubby and Watts 1997
5099	A Cultural Resource Magnetometer Survey for Breakwater Construction, Sunny Isles Vicinity, Dade County, Florida	Hall 1994
5379	<i>Cultural Resource Archaeological Investigations of Potential Beach Nourishment Sand Borrow Sites Offshore of Broward County, Florida</i>	Baer 1997
6266	<i>Cultural Resources Remote Sensing Survey of Channel Improvements at Hillsboro Inlet, Broward County, Florida</i>	Hall 1998
6269	Archaeological Diver Identification and Evaluation of Thirteen Potentially Significant Submerged Targets at Hillsboro Inlet, Broward County, Florida	Hall 1999
6603	Offshore Borrow Areas, Submerged Historic Properties Survey, Boca Raton, Palm Beach County, Florida	Tubby and Watts 2001
6679	Resource Report 4, Cultural Resources for Calypso Pipeline, LLC, Calypso Natural Gas Pipeline Project	Janus Research 2001
7039	Historic Assessment and Remote Sensing Survey at Port Everglades, Broward County, Florida	Hall 2002
8598	Archaeological SCUBA/ROV Investigation of Fifteen Potentially Significant Submerged Archaeological Resources for the Broward county Shoreline Protection Project	Gifford 2001
11926	A Report on the Holcombe Site, a Newly Discovered Shipwreck off Ft. Lauderdale Beach	Smith 2005
12205	Archaeological Survey and Assessment of Hillsboro Inlet Mitigation Area, Broward County, Florida	Gifford 2005
13997	Archaeological Remote Sensing North Boca Raton Beach Renourishment Project, Boca Raton, Palm Beach County, Florida	Tubby and Watts 2006a
13662	Marine Cultural Resources Study, Port Everglades Sand Bypass Project, Broward County, Florida	Tubby and Watts 2006b
16078	<i>Remote Sensing Survey Report of Lease Area E-149 A</i>	Vone Research, Inc. 2001
17980	<i>Historic Assessment of Derelict Vessels in the Intracoastal Waterway Near Dania Beach Boulevard Bridge, Broward County, Florida</i>	Lydecker 2009

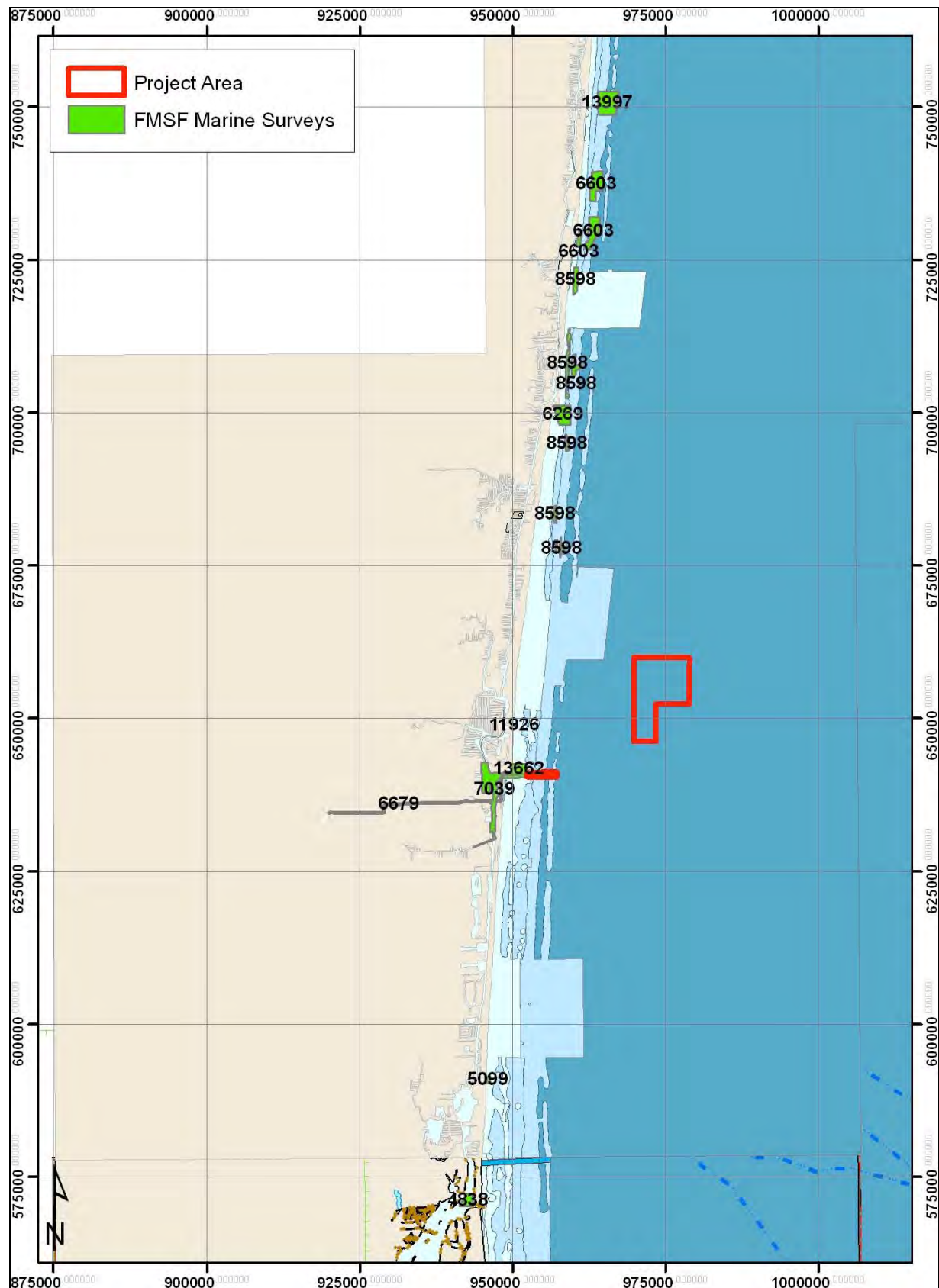


Figure 2-12. Recent marine surveys in the project vicinity (source: FMSF).

Seven surveys were conducted along portions of the Broward, Dade and Palm Beach counties coastline for proposed sand borrow locations for beach renourishment projects (CP&E, Inc 1986, 1989, Baer 1997, Tubby and Watts 2006, Gifford 2001, Tubby and Watts 2001, Tubby and Watts 2006b). The first of these dealt with borrow areas off the shore of Hollywood Beach (CP&E, Inc. 1986, FMSF 1335)). Several years later another survey was conducted in the same vicinity, off the shore of Hollywood and Hallandale beaches (CP&E, Inc. 1989, FMSF 2099). A much larger area was covered by the 1997 survey, which included multiple borrow areas off the shore of Pompano Beach, Deerfield Beach, Lauderdale-By-The-Sea, and Hillsboro Beach (Baer 1997). The anomalies identified in the 1997 survey (Baer 1997, FMSF 5379) were further investigated in a 2001 survey to determine their significance (Gifford 2001, FMSF 8598)). One shipwreck, the bow section of the *S.S. Copenhagen* (8BD2567), was identified during the course of this project.

The *S.S. Copenhagen*, along with the *Gil Blas* (8BD67) and the Barefoot Mailman (8BD68) shipwrecks were addressed by several investigations summarized by Vone Research, Inc. in their 2001 report of survey work in and around their lease area E-149A. This area is just off the coast from the Hillsboro Inlet and north to Deerfield Beach (Vone Research, Inc. 2001, FMSF 16078). FMSF Survey No. 11926 summarizes the discovery made by a snorkeler just north of Port Everglades. Wood planks with iron fasteners were found partially exposed in the sand in 5–6 feet of water. Designated as a possible wreck, 8BD4231-Holcombe could not be matched to a known named wreck (Smith 2005). FMSF Survey No. 17980 was conducted in the vicinity of Dania Beach, near the Dania Beach Boulevard Bridge. The investigations found two derelict vessels. These were recorded as *Shark* (8BD4775) and *Catharina Uhrweder* (8BD4822; Lydecker 2009) at their temporary locations in the Gulf Intracoastal Waterway (GIWW) before being removed and sunk off Miami.

Two of the studies were remote sensing surveys conducted within the Hillsboro Inlet (Hall 1998; Gifford 2005). The first of these surveys was conducted prior to dredging and channel improvements to the inlet, and located 23 magnetic anomalies, 13 of which were recommended for further investigation (Hall 1998, FMSF 6266). These targets were examined in 1999 (Hall 1999, FMSF 6269), which identified them all with the result that none were submerged sites or historic shipwrecks. The survey in 2005 was of a mitigation area just east of the Hillsboro Inlet and only modern materials, possibly related to civil engineering and dredging activities, were noted (Gifford 2005, FMSF 12205).

Three of these surveys dealt with Port Everglades and its vicinity (Janus Research 2001; Hall 2002; Watts and Tubby 2006b). Investigations by Janus Research within Port Everglades were concentrated on the pipeline corridor. No underwater resources were noted; however, Port Everglades itself was part of the investigation of 8BD180 (Janus Research 2001, FMSF 6679). Prior to dredge work within portions of the Port Everglades navigation channels another survey was conducted within Port Everglades, but no submerged resources were discovered beyond those of the port itself (Hall 2002, FMSF 7039). The survey in 2006 was for a sand bypass at Port Everglades and investigations resulted in the documentation of two resources: 8BD4254-PE-N179 noted as a twentieth-century shipwreck, possibly of a shrimp boat, and 8BD4255 a potentially NRHP-eligible, historic, 1932 submerged breakwater (Watts and Tubby 2006b, FMSF 13662).

South of the current project area, a 2001 survey examined three borrow areas offshore Boca Raton and one shoal area at Boca Raton Inlet (Tubby and Watts 2001, FMSF 6603). The survey located 56 anomalies, with 19 identified as having high potential as shipwreck material. Ten were recommended for avoidance due to the potential for direct impact by dredging. Diving investigations identified two of the targets as modern debris and recommended the remaining for avoidance. Another borrow area offshore Boca Raton conducted in 2006 (Tubby and Watts 2006a, FMSF 13997) located ten magnetic anomalies, four of which were recommended for

avoidance as potential shipwreck sites. Another survey in 1994 (Hall 1994, FMSF 5099) conducted in the Sunny Isles vicinity for construction of a breakwater found nothing.

SHIPWRECK INVENTORY

Several sources were consulted for known/existing shipwreck sites in the project vicinity, including the FMSF, National Oceanic and Atmospheric Administration (NOAA) databases, dive shops, and various popular publications.

The FMSF lists 17 historic shipwrecks and/or sites for Broward and Palm Beach counties within 20 miles of the survey areas (Figure 2-13; Table 2-02). They are generally nineteenth- or twentieth-century American, with a few notable exceptions, including Barefoot Mailman Wreck (BD00068), classified as French and Highland Beach Wreck (PB00210), classified as European. Some have been positively identified, including *S.S. Copenhagen* (BD02567), *S.S. Richmond* (BD00071), *Holcombe* (BD04231), and *Robert Edminster* (BD04408). One, *S.S. Copenhagen*, is listed on the NRHP. Three wrecks, two unidentified (Barge Wreck [BD04402] and Ancient Mariner Wreck [BD04407]) and one identified (*Robert Edminster* [BD04408]), and a breakwater (Port Everglades North Breakwater [BD4255]) have been determined as potentially eligible for the NRHP by the Florida State Historic Preservation Office (SHPO). Moreover, of the 17 sites listed in Table 2-02, 11 (Sunrise Wreck [BD00067], Barefoot Mailman Wreck [BD00069], *S.S. Richmond* [BD00071], Anchor [BD02355], Holcombe [BD04231], 8 Cannon [BD04401], Barge Wreck [BD04402], Mooney's Cove [BD04405], New Rover SW 4th Ave., Target [BD04406], and Robert Edminster [BD04408] are within 1 mile of the Project Area. Illustrated in Figure 2-14 the breakwater, listed in the FMSF as 8BD4255, lies outside the Project Area and was determined potentially NRHP eligible (Tubby and Watts 2006b).

In addition to the FMSF and other sources, the current online edition of NOAA's Automated Wreck and Obstruction Information System (AWOIS) was consulted for known wreck sites and obstructions within or near the current survey area. The AWOIS contains information on over 10,000 wreck sites and obstructions/hangs in the coastal waters of the U.S. Information within the database includes latitude and longitude of each feature along with any known historic and/or descriptive details. The AWOIS website, which may be accessed at <http://historicals.ncd.noaa.gov/awoisdbsearch.asp>, allows researchers to search for wrecks based on the coordinates for a given area. It also allows the download of the entire database by section for import into geographic information system (GIS). The area encompassing the current Project Area is Area 8, which covers much of the Gulf of Mexico, Florida, and Florida's Atlantic coast. The data was downloaded in Microsoft Access format and imported into the project GIS database. An area encompassing an approximately 20-mile radius around the current Project Area was searched for wrecks and obstructions. Eight wrecks are in the vicinity (Figure 2-15; Table 2-03), including *Copenhagen* (AWOIS No. 2858), *Cumberland* (AWOIS No. 123), *Crazy Jim* (AWOIS No. 108), *Frank Baker* (AWOIS No. 117), *Sama* (AWOIS No. 113), *Kathryn Dwyer* (AWOIS No. 9913), *Conmar* (AWOIS No. 105), and one unknown (AWOIS NO. 9906).

Also consulted was the list of artificial reefs in Broward County. This information is available from NOAA National Oceanographic Data Center (www.nodc.noaa.gov). Because the reef locations are known, the search was conducted to ascertain if any are located in the current Project Area. Although there are several dozen artificial reef emplacements off Port Everglades, there are none in or within 1 mile of the Project Area (Figure 2-16).

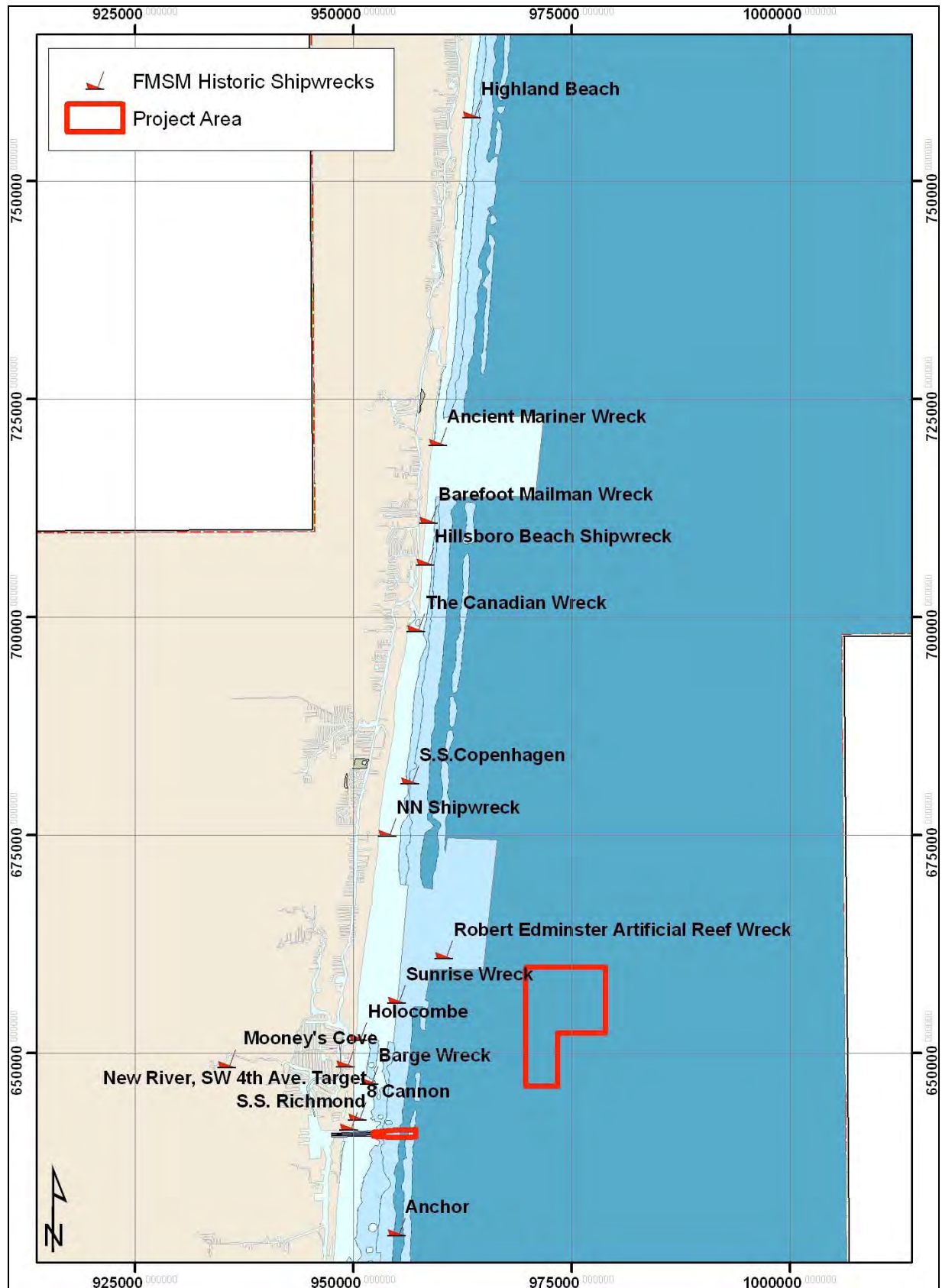


Figure 2-13. Known wrecks in the project vicinity (source: FMSF).

Table 2-02. Known Wrecks in the Project Vicinity.*

Site ID	Site Name	Site Type	Culture	NRHP Evaluation	Date NRHP Listed
BD04231	Holocombe	Historic shipwreck	Twentieth century American, 1900-present	Insufficient Information	
BD04401	8 Cannon	Historic shipwreck	Nineteenth century American, 1821-1899	Not Evaluated by Recorder	
BD04402	Barge Wreck	Historic shipwreck	Nineteenth century American, 1821-1899	Eligible for NRHP	
BD04405	Mooney's Cove	Building remains	Nineteenth century American, 1821-1899	Not Evaluated by Recorder	
BD04406	New River, SW 4th Ave. Target	Historic shipwreck	Nineteenth century American, 1821-1899	Not Evaluated by Recorder	
BD04407	Ancient Mariner Wreck	Historic shipwreck	Nineteenth century American, 1821-1899	Eligible for NRHP	
BD04408	Robert Edminster Artificial Reef Wreck	Other	Nineteenth century American, 1821-1899	Eligible for NRHP	
BD04460	The Canadian Wreck	Historic shipwreck		Not Evaluated by Recorder	
BD00067	Hillsboro Beach Shipwreck	Historic shipwreck	Nineteenth century American, 1821-1899	Not Evaluated by Recorder	
BD00068	Barefoot Mailman Wreck	Historic shipwreck	French	Not Evaluated by Recorder	
BD00069	Sunrise Wreck	Historic shipwreck	Nineteenth century American, 1821-1899	Not Evaluated by Recorder	
BD00070	Nn Shipwreck	Historic shipwreck	Historic	Not Evaluated by Recorder	
BD00071	S.S. Richmond	Historic shipwreck	Nineteenth century American, 1821-1899	Ineligible for NRHP	
BD02355	Anchor	Historic shipwreck		Not Evaluated by Recorder	
BD02567	Ss Copenhagen	Historic shipwreck	Nineteenth century American, 1821-1899	Not Evaluated by Recorder	5/31/01
PB00210	Highland Beach	Historic shipwreck	European	Not Evaluated by Recorder	
8BD4255	Port Everglades North Breakwater	Breakwater	Twentieth century American, 1900-present	Potentially eligible for NRHP	

*Source: Florida Master Site File

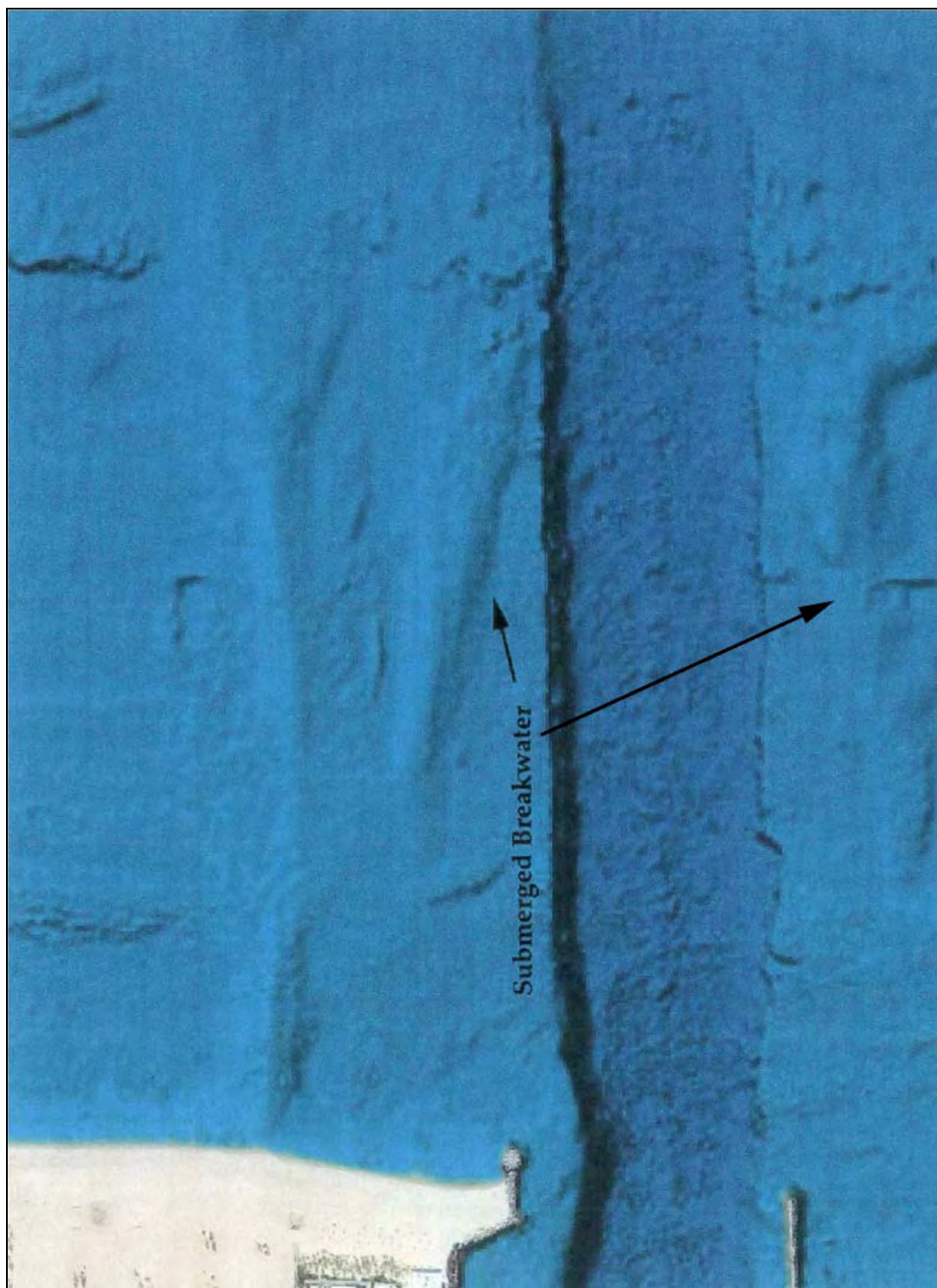


Figure 2-14. Location of the breakwater, 8BD4255 in relation to the current channel.

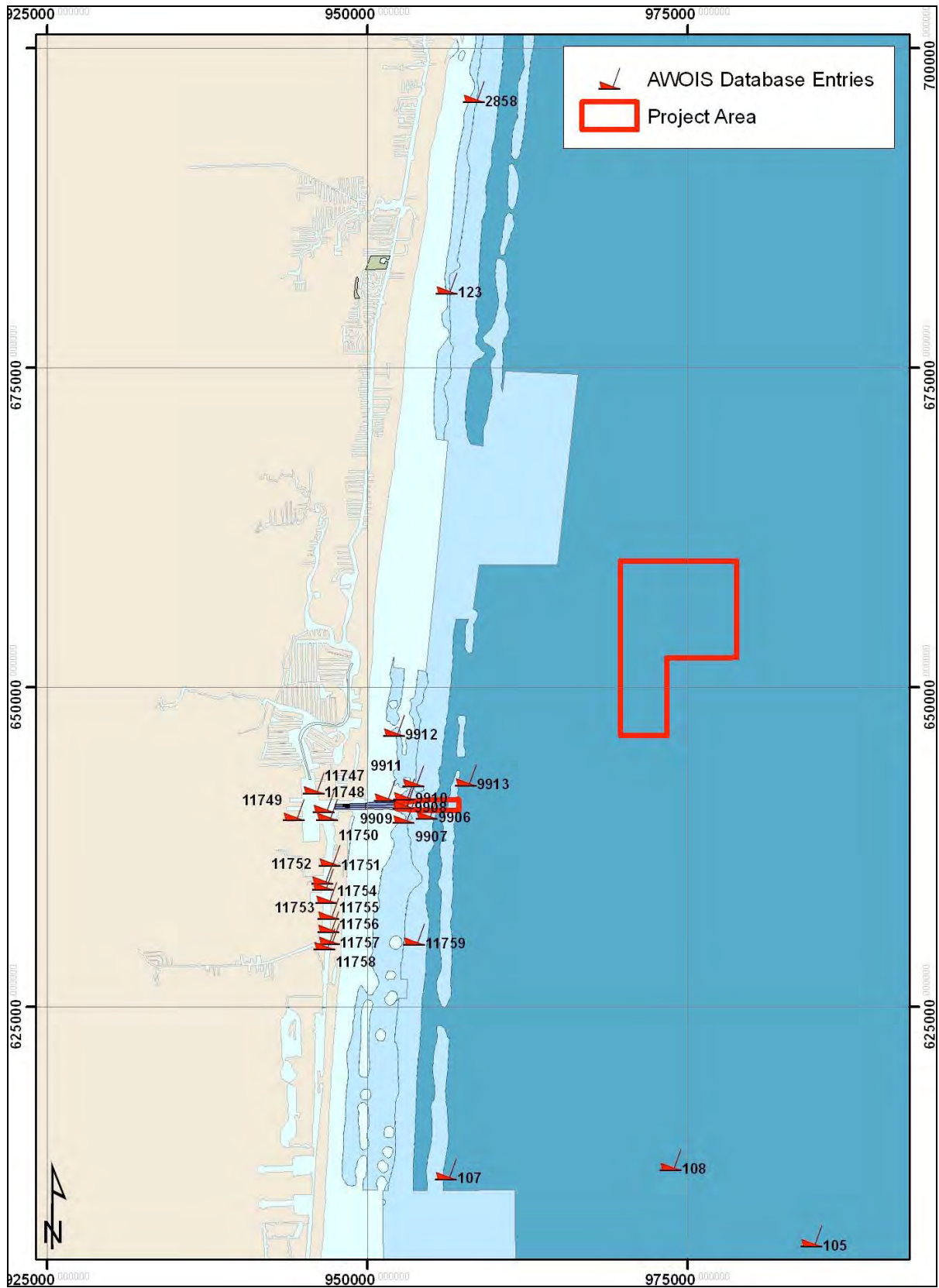


Figure 2-15. AWOIS database entries in the project vicinity.

Table 2-03. AWOIS Database Entries for Project Vicinity.

Record	Vessel Terms	Year Sunk	History	E	N
105	Conmar	0	Cargo, 231 Gt, Sunk 9/00/44 By Marine Casualty	984705	607081
107	Obstruction	0	Unknown 1942	956197	612325
108	Crazy Jim	0	Wooden Hull Vessel, 39 Ft L, Sunk In 822 Ft of Water	973710	613057
113	Sama	0	Cargo, 567 Gt; Sunk 5/3/42 By Submarine	1066598	632021
117	Frank Baker	0	Trawler, 100 Gt, Sunk 11/13/43 By Marine Casualty	1028030	661962
123	Cumberland	0	Unknown 1944	956258	681591
2858	Copenhagen	0	Unknown	958338	696550
9906	Unknown	1982	A Vessel Of Unknown Size And Type	954703	640528
9907	Obstruction	0	Submerged Breakwater	952870	640239
9908	Obstruction	0	Submerged Breakwater	952863	641350
9909	Obstruction	0	Rocky Feature	951399	641945
9910	Obstruction	0	Spoil Area	952903	642057
9911	Obstruction	0	Unknown	953625	643072
9912	Obstruction	0	Unknown	952112	647019
9913	Kathryn Dwyer	0	36-Ft Kathryn Dwyer	957714	643131
11747	Obstruction	0	Manatee Sign	945843	642509
11748	Obstruction	0	Manatee Sign	946619	641023
11749	Obstruction	0	Manatee Sign	944289	640412
11750	Obstruction	0	Manatee Sign	946906	640430
11751	Obstruction	0	Manatee Sign	947119	636832
11752	Obstruction	0	Manatee Sign	946548	635440
11753	Obstruction	0	Manatee Sign	946583	634997
11754	Obstruction	0	Manatee Sign	946831	633967
11755	Obstruction	0	Manatee Sign	946995	632687
11756	Obstruction	0	Manatee Sign	947002	631677
11757	Obstruction	0	Manatee Sign	947036	630728
11758	Obstruction	0	Dolphin	946701	630331
11759	Obstruction	0	Submerged Bouys	953712	630683

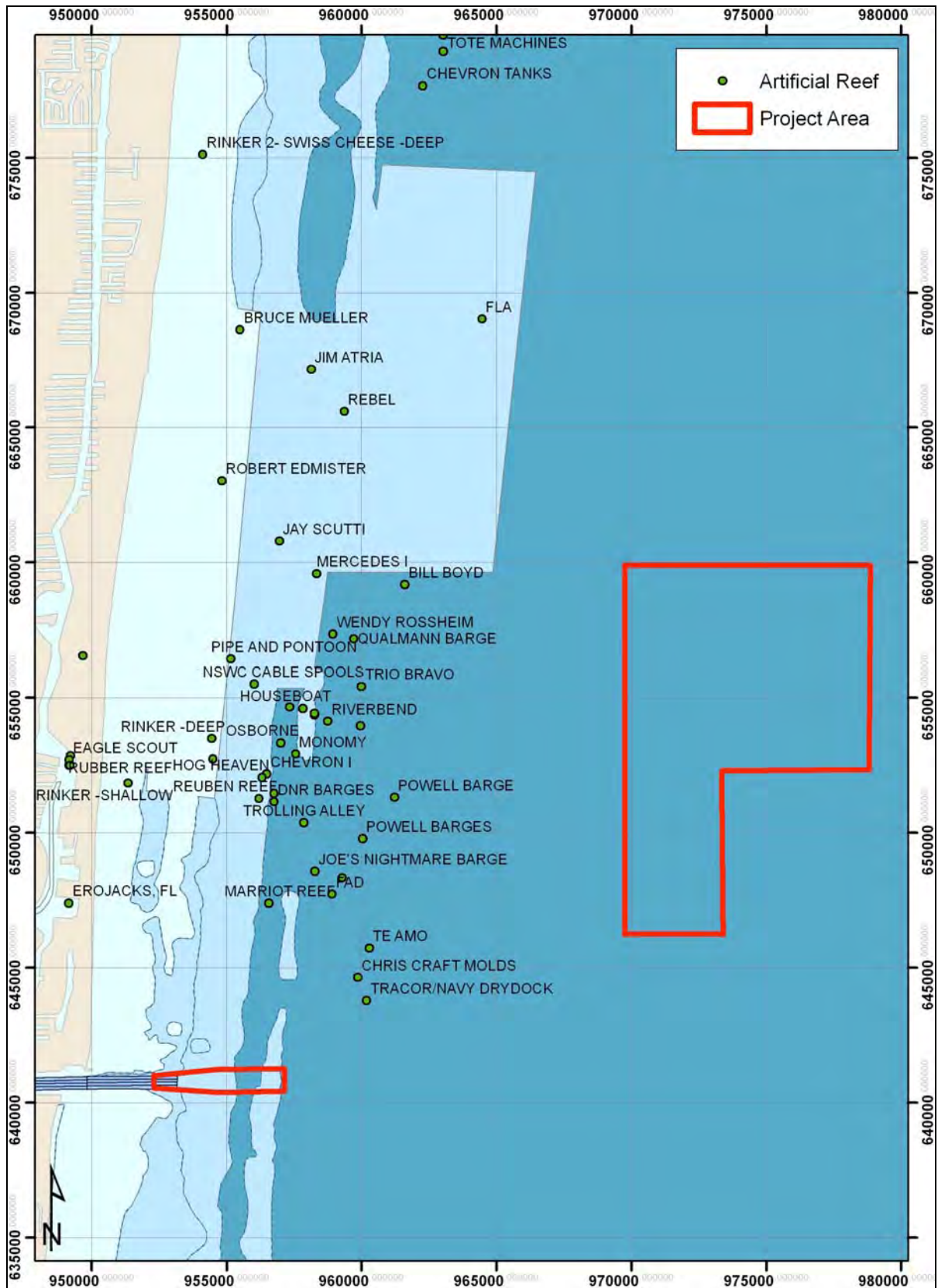


Figure 2-16. Artificial reefs in immediate project vicinity (source: NOAA National Oceanographic Data Center).

III. INVESTIGATIVE PROCEDURES

Panamerican conducted archaeological review of remote sensing data under the direction of Principal Investigator Andrew D.W. Lydecker. The survey took place November 11–15, 2011. The survey was conducted by a crew from Alpine Ocean Seismic Survey (Alpine) of Norwood, New Jersey, aboard the *R/V Shearwater*, using equipment and procedures chosen specifically to meet the project requirements and described below. The Alpine Party Chief was Dan Ciarletta; Surveyors included Phil Morton, Francis Stankiewicz, and Jon Spink. The archaeological monitor for data collection was Michael K. Faught.

REMOTE SENSING SURVEY EQUIPMENT

The remote-sensing survey was conducted with equipment and procedures intended to facilitate the effective and efficient search for magnetic anomalies and acoustic targets on the seafloor bottom, and to determine their exact location. This included magnetometer and sidescan sonar devices for remote sensing with Ultra-Short Base Line (USBL) tracking and a differential global positioning system (DGPS) for positioning. A subbottom profiling system was not employed as the ODMDS is too deep to have allowed human population and the channel area was previously dredged.

DIFFERENTIAL GLOBAL POSITIONING SYSTEM

The primary consideration in the search for any submerged item is positioning. Accurate positioning is essential during the running of survey tracklines, and it is essential in returning to recorded locations for remote sensing refinement or diver investigations. Positioning was accomplished during the project using an Applanix POS M/V 320 Inertially-Aided Real-Time Kinematic (IARTK) navigation system (Figure 3-01). This system maintains survey grade positional accuracy by providing accurate attitude, heading, pitch, roll, heave, and velocity data to the navigation system software. The system uses twin GPS antennae to provide accurate velocity and heading data, and an Inertial Reference Unit (IRU) to provide accurate vessel pitch, roll, and heave data.

The project was planned in the Florida State Plane East NAD83 (feet) coordinates, and all sidescan, subbottom, and magnetometer target data have been converted to and illustrated with this grid. The DGPS data streams are in geographic format, WGS84 (i.e. latitude, longitude). The raw data from the sidescan and subbottom devices are archived in this format. Final data presentation, including maps and tables, are presented in Florida State Plane East (feet).

Navigation was conducted with a PC computer using QINSy Hydrographic Management Software for navigation, which was written and developed by Quality Positioning Services BV specifically for marine survey applications.

Towfish positioning was maintained with an USBL acoustic tracking system. The system consists of a hydrophone transponder, topside unit, and individual pinger/responder unit that is attached to the sidescan, from which the magnetometer trailed at a constant distance. The USBL system calculates position by combining range and bearing data from the responder with positioning data from the vessel navigation system. The USBL hydrophone transponder pings the responder at a set time interval, which responds with a signal. The topside unit uses the direction of the signal and the time differential between ping and response to calculate the position of the responders, providing an accurate real time location for the towfish associated with those responders. This position information is then fed to the navigation software, which applies the position to the incoming data for each towfish, saves it with that data, and displays

those locations on the navigation screen. The unit used for the survey was a Sonardyne Scout Pro (Figure 3-02).

The USBL system was calibrated before the survey using QINSy's internal calibration program with a "clover" pattern run by the survey vessel to ensure accuracy. All positioning coordinates are based on the position of the USBL responder. Tow position for the USBL-sidescan-magnetometer array was noted and used in target location. Layback information was also collected for the amount of cable out and the positions of the antenna with respect to the sheave offset for backup (Figure 3-03).



Figure 3-01. Applanix POS MV 320 vessel position and orientation system used during the investigation (courtesy of Applanix).



Figure 3-02. Sonardyne Scout Pro USBL positioning system (courtesy of Sonardyne).

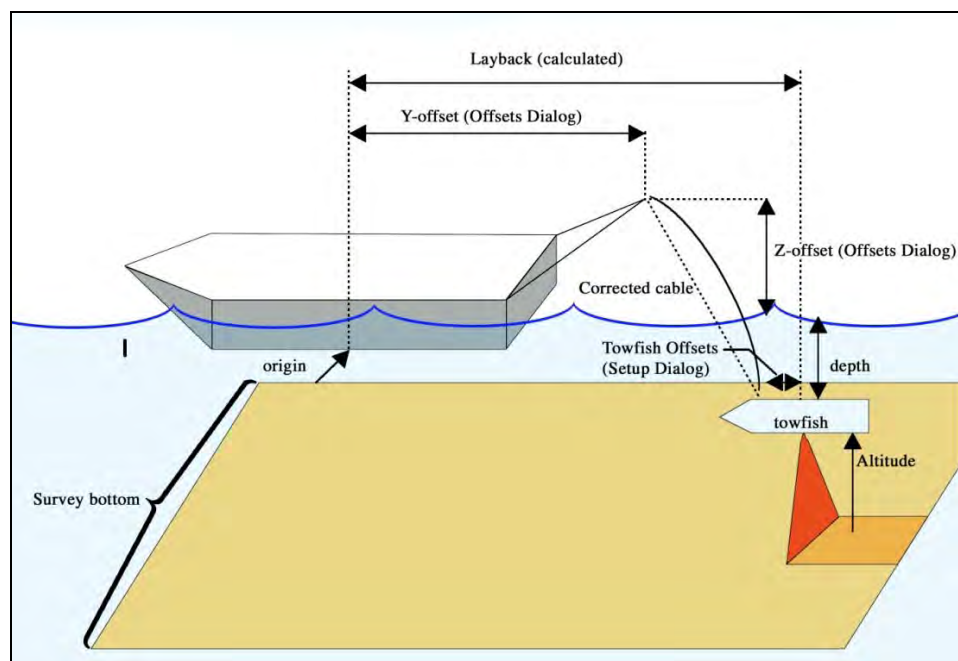


Figure 3-03. Equipment schematic illustrating layback (courtesy of Coastal Oceanographics, Inc.).

MAGNETOMETER

The remote-sensing instrument used to search for ferrous objects on or below the sea floor of the survey area was a Geometrics G-882 Cesium Vapor magnetometer (Figure 3-04). The magnetometer is an instrument that measures the intensity of magnetic forces. The sensor measures and records both the Earth's ambient magnetic field and the presence of magnetic anomalies (deviations from the ambient background) generated by ferrous masses and various other sources. These measurements are recorded in nanoteslas, the standard unit of magnetic intensity (equal to 0.0000001 tesla). The G-882 is capable of sub-second repeatability, and data were collected at 5 hertz (five per second) both digitally and graphically, providing a record of the ambient field and the character and amplitude of anomalies encountered. These data were stored electronically in the navigation computer. The magnetometer was towed behind the sidescan towfish at a constant distance of 30 feet (Figure 3-04).

The ability of the magnetometer to detect magnetic anomalies, the sources of which may be related to submerged cultural resources such as shipwrecks, has caused the instrument to become a principal remote-sensing tool of marine archaeologists. While it is not possible to identify a specific ferrous source by its magnetic field, it is possible to predict shape, mass, and alignment characteristics of anomaly sources based on the magnetic field recorded. It should be noted that there are other sources, such as electrical magnetic fields surrounding power transmission lines, underground pipelines, navigation buoys, or metal bridges and structures, that may significantly affect magnetometer readings. Interpretation of magnetic data can provide an indication of the likelihood of the presence or absence of submerged cultural resources. Specifically, the ferrous components of submerged historic vessels tend to produce magnetic signatures that differ from those characteristics of isolated pieces of debris. While it is impossible to identify specifically the source of any anomaly solely from the characteristics of its magnetic signature, this information, in conjunction with other data (historic accounts, use patterns of the area, diver inspection), other remote-sensing technologies, and prior knowledge of similar targets, can lead to an accurate estimation.

For this project the magnetometer was interfaced with a Windows PC computer, utilizing MagLog for data collection and storage. These records consist of X, Y, Z coordinates, where Z is the deviance from magnetic background, X and Y are the Easting and Northing coordinates in Florida East State Plane Feet.

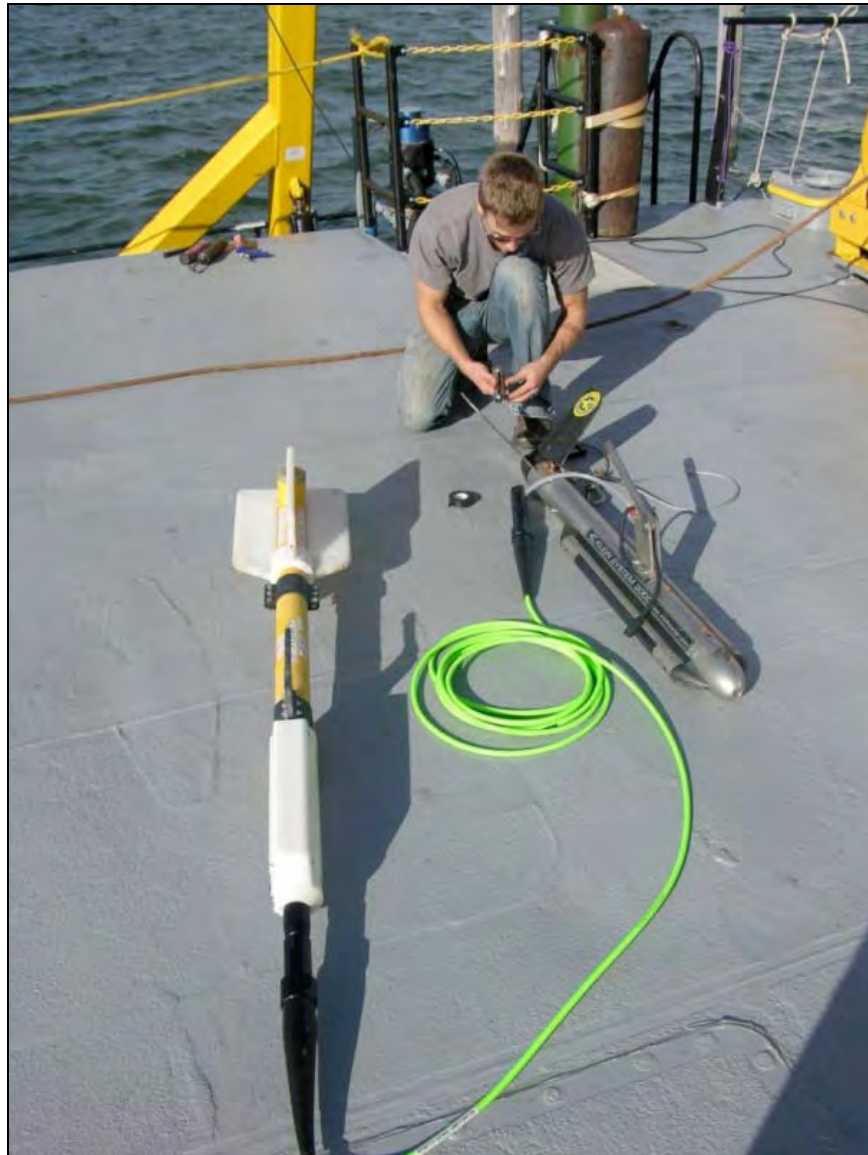


Figure 3-04. Sidescan sonar and magnetometer array towed during the project. USBL unit was attached to the sidescan, and the magnetometer trailed both at a constant distance of 30 feet.

SIDECAN SONAR

The remote-sensing instrument used to search for physical features on or above the bottom of the seafloor was a Klein Model 3000 100 and 500 kilohertz sidescan sonar dual channel system (Figure 3-04). The sidescan sonar is an instrument that, through the transmission of dual fan-shaped pulses of sound and reception of reflected sound pulses, produces an acoustic image of the bottom. Under ideal circumstances, sidescan sonar is capable of providing a near-photographic representation of the objects on the bottom and on either side of the trackline of a survey vessel. Data collection was accomplished using Klein's proprietary SonarPro collection and processing software.

The range setting for the Channel Block of the survey was collected at 500 kilohertz and 50-meter range, whereas the ODMDS Block was remotely sensed at 100 kilohertz and 150-meter range. The magnetometer and sidescan were towed in tandem with the magnetometer towed a constant distance of 30 feet behind the sidescan. Both instruments were deployed off the stern of the vessel with cable deployment rate and depth handled by automatic winch (Figure 3-05).

In addition to the USBL system, magnetometer, and sidescan sonar, other devices and procedures were employed to ensure adequate data quality and control. These are determination of the sound velocity in water of the project area and compensation for the roll, pitch, and heave of the vessel.



Figure 3-05. Magnetometer and sidescan sonar array being deployed; Port Everglades in the background.

SOUND VELOCITY

In order to ensure the USBL precision, a specialized device called a velocimeter was employed to determine the speed of sound through the water in the survey area. This is necessary given that the velocity of sound through water is not a constant, but can change depending on the amount of dissolved minerals in the water along with other factors like temperature, salinity, and turbidity. An AML Oceanographic Minos-X vertical profiler was used to produce a velocity profile for the entire water column (Figure 3-06). This data was saved on the survey computer for use in calibrating USBL data.



Figure 3-06. AML Oceanographics Minos-X velocimeter (courtesy of ALM Oceanographic).

VESSEL CONTROL

Compensation for the movement of the survey vessel is essential for the collection of accurate GPS positioning data. In order for the three-dimensional data to be in the right position spatially, accurate data pertaining to pitch (rotational movement in the Z plane), roll (rotational movement in the Y plane), and yaw (rotational movement in the X plane) of the survey vessel must be collected and fed to the navigation and data display software in real time. This data is then used to compensate in real time for the movement of the survey vessel. This was accomplished by the aforementioned Applanix POS MV 320, which is specifically designed for use with multibeam sonar systems and provides locational data that meets International Hydrographic Survey (HIS) standards. In addition to an inertial navigation system, the kit also included an Inertial Measurement Unit (IMU), which consists of a Motion Reference Unit (MRU) and a gyrocompass. The MRU senses the movement of the vessel, measures it in real time, and sends this information to the POS MV 320 topside unit. The gyrocompass provides survey grade, real-time heading data to the POS MV 320 topside unit.

SURVEY VESSEL

The vessel used during the remote-sensing survey was the 110-foot, twin hull, offshore survey vessel *R/V Shearwater* (Figure 3-07). The *R/V Shearwater* is equipped with two A-frames and a crane for sensor deployment, dedicated lab space, crew quarters for up to 20 people, and autonomy to remain offshore for up to 14 days. The vessel conforms to all U.S. Coast Guard specifications according to class and has a full complement of safety equipment. The vessel carries appropriate emergency supplies including lifejackets, spare parts kit, tool kit, first-aid supplies, flare gun, and air horns. The vessel remained offshore for the entire survey, except for weather days in Miami, and crew transit at Palm Beach Marina.



Figure 3-07. The 110-foot *R/V Shearwater* was the primary survey vessel during the current investigation (courtesy of Alpine).

SURVEY PROCEDURES

Coordinates for the surveys were entered into the navigation program QINSy and pre-plotted tracklines were produced with a 100-meter transect interval for the ODMDS survey area, and a 30-meter transect interval for the Channel survey area (Figures 3-08 and 3-09). The survey vessel would transit to the coordinates as indicated by the navigation system. The survey instruments were mobilized, tested, found operational, and then the running of pre-plotted tracklines began. The helmsman viewed a video monitor, linked to the POS MV 320 and navigational computer, to aid in directing the course of the vessel relative to the individual survey transects. The monitor displayed the real-time position of the path of the survey vessel along the trackline. The speed of the survey vessel was maintained at approximately 3–4 knots for the uniform acquisition of data.

As the survey vessel maneuvered down each trackline, the navigation system determined vessel position along the actual line of travel every second. The computer recorded positioning and magnetometer data multiple times per second. Vessel speed was 1.5–2 meters per second (4.5–6 feet per second), acquiring magnetic data at 5 hertz. The positioning points along the line traveled were recorded on the computer hard drive and the magnetic data were also recorded digitally.

Each trackline was run until completed. Any navigational errors, problems with the remote-sensing instruments, or with the GPS during the running of a line resulted in the termination of that run and a re-run. Significant off-line errors in navigation were re-run. Problems with remote-sensing instruments were resolved before repeating the run of an aborted line.

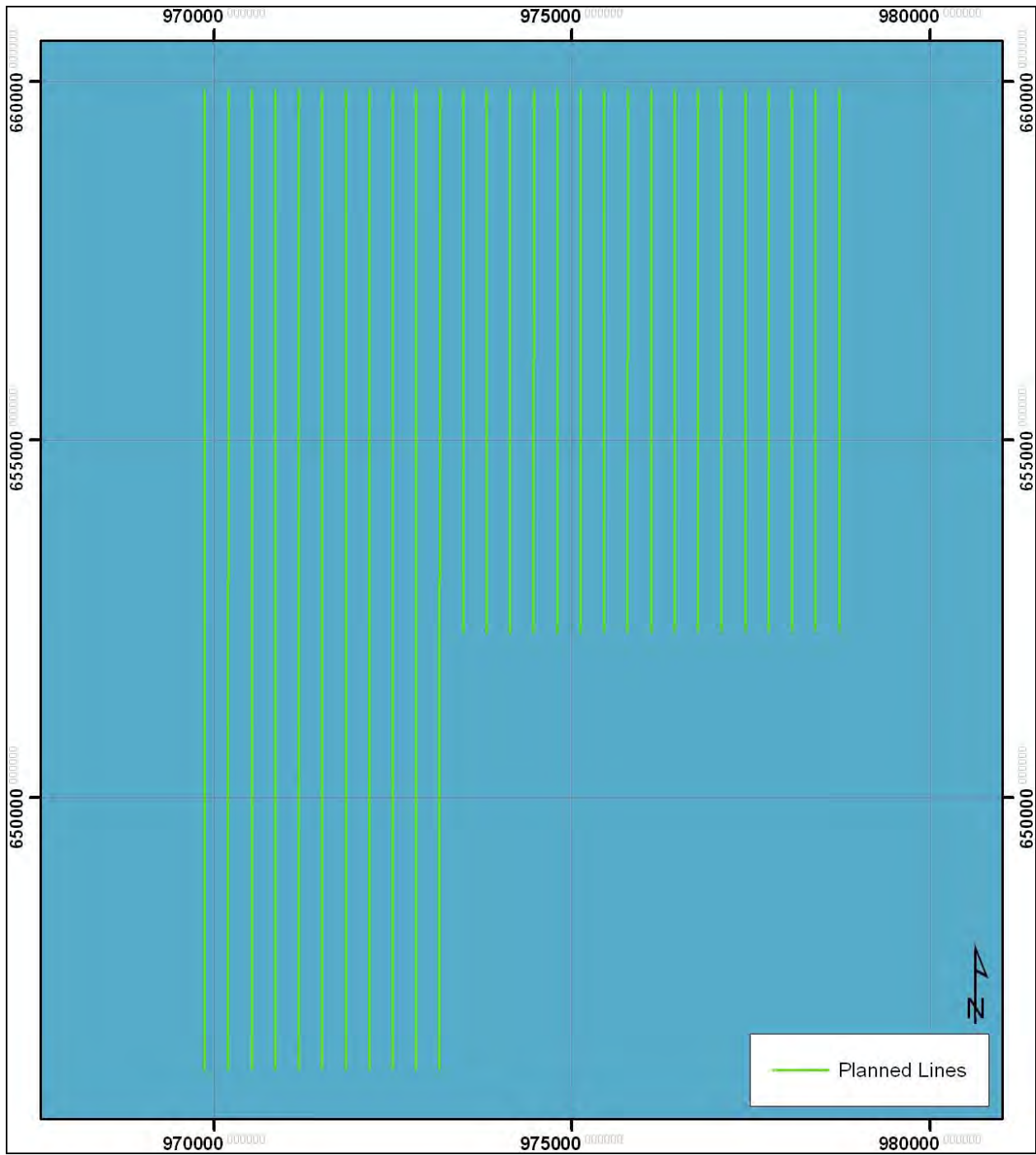


Figure 3-08. Planned survey lines for the ODMDS survey area.

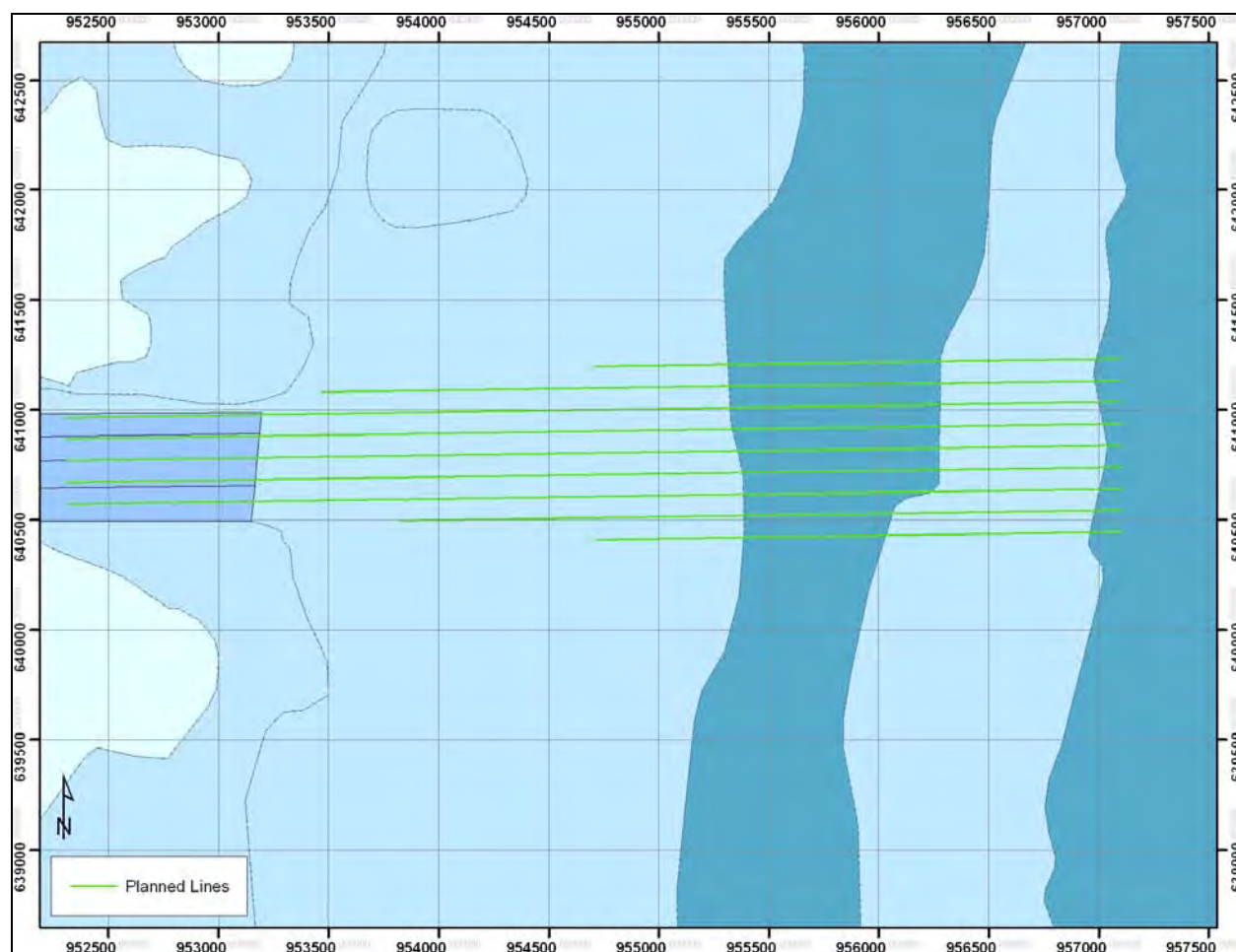


Figure 3-09. Planned survey lines for the Channel survey area.

ENVIRONMENTAL CONDITIONS

The conditions encountered during the project were typical for the eastern coast of Florida in November, partly cloudy and cool with winds of 12–20 knots and seas to 5-foot common. Some conditions exceeded these limits and crew and ship waited on weather for two days in Miami for conditions to improve. It should be stated that the survey was initially scheduled for November 1, 2011, but the two weeks prior to the actual survey witnessed a prohibitive weather system that produced extremely large waves and winds that precluded survey.

MAGNETIC DATA COLLECTION AND PROCESSING

Data from the magnetometer were collected using MagLog. The data were exported and provided to Panamerican as an *.XYZ text file consisting of easting and northing positions and a Y value nanotesla reading. Contour maps of the magnetic data were produced with the TIN Modeler function of Hypack. The *.DXF file is saved and exported into the combined GIS database. The contour maps allow a graphic illustration of anomaly locations, spatial extent, and association with other anomalies. In addition, analysis of magnetic data was undertaken by Alpine, and Panamerican was provided with a table of anomalies including position, strength, duration in meters, and height of towfish off bottom.

SIDESCAN SONAR DATA COLLECTION AND PROCESSING

Post-processing of sidescan sonar data is accomplished using SonarWiz.MAP, a product that enables the user to view the sidescan data in digitizer waterfall format, pick targets, and enter target parameters including length, width, height, material, and other characterizations into a database of contacts. In addition, SonarWiz.MAP “mosaics” the sidescan data by associating each pixel (equivalent to about 10 centimeters) of the sidescan image with its geographic location determined from the DGPS position (layback rectified) and distance from the DGPS position. SonarWiz.MAP is the industry standard for mosaicing capability, and the results are exported as geo-referenced *.TIFFs for importing to the GIS database of the project (Figures 3-10 and 3-11). SonarWiz.MAP can generate target reports in *.PDF, Word, or Excel format. Panamerican utilizes the Word format for reports.

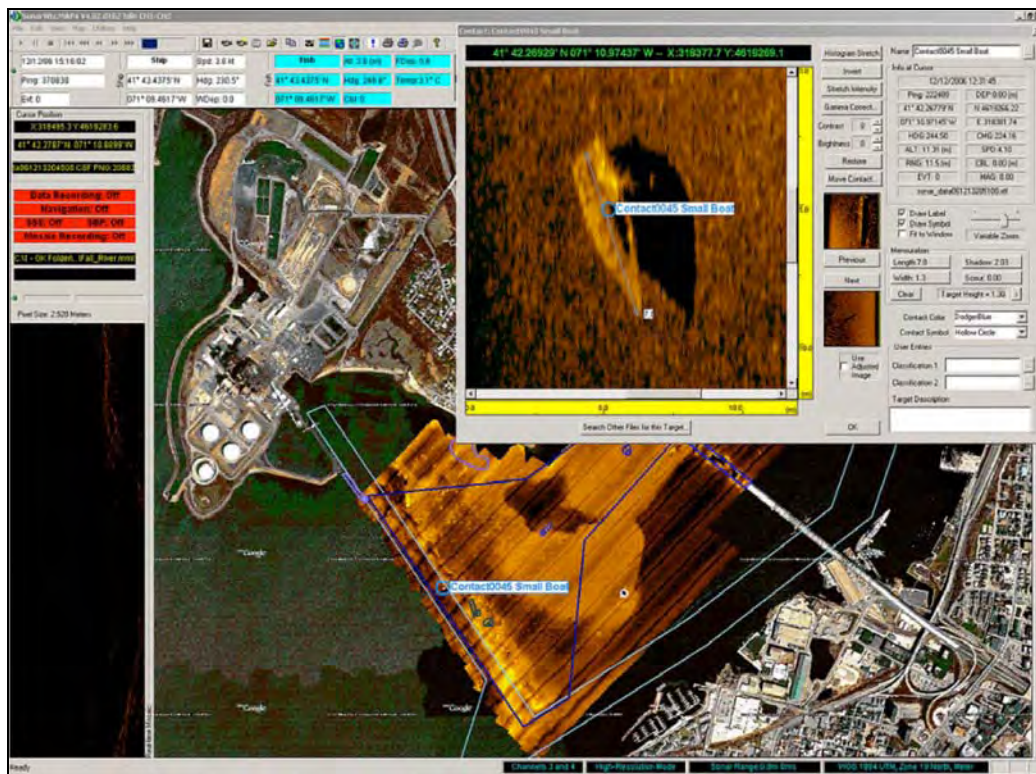


Figure 3-10. SonarWiz.MAP software with mosaic example in the background and a target selection zoom image to the upper right.

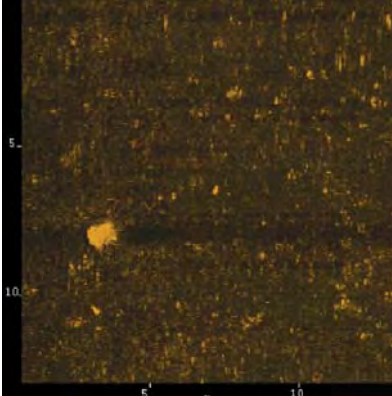
	<p>C013</p> <ul style="list-style-type: none"> • Sonar Time at Target: 10/21/2011 18:06:43 • Click Position (Projected Coordinates) (X)458756.073(Y)86416.744 • Map Proj: STATE PLANE-MARYLAND-METERS • Range to Target: 7.28 Meters • Fish Height: 1.83 Meters • Heading: 41.100 degrees • Line Name: 76111021140500 	<p>Dimensions</p> <p>Target Height: 0.40 Meters Target Length: 0.94 Meters Target Shadow: 2.10 Meters Target Width: 1.22 Meters Mag Anomaly: Classification: Debris Area: Taylor Island Block: AC3 Description: Apparent debris</p>
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Figure 3-11. SonarWiz.MAP sonar contact tabular format, automatically generated in Word format.

GEOGRAPHIC INFORMATION SYSTEMS ANALYSIS

A project GIS database is constructed using geo-referenced images and layers generated during the magnetometer, sidescan, and subbottom data analyses. Other layers can be added, such as orthophoto quads or navigation charts.

Several important things are accomplished by GIS compilation. First, the collected data are compared to one another and evaluated for accuracy and consistency of the positioning information. Second, magnetic and sidescan data are compared for relationship (proximity analysis).

DATA ANALYSIS CRITERIA, THEORY, AND COMMENTARY

The remote sensing survey of the Project Area intended to locate and identify the presence or absence of potentially significant submerged cultural resources that, if present, might be adversely affected by the proposed activities. However, the interpretation of remote sensing data obtained from both the magnetometer and sidescan sonar, as stated by Pearson et al. (1991) “relies on a combination of sound scientific knowledge and practical experience.” The evaluation of remote sensing anomalies, with regard to a determination that the anomaly does or does not represent a shipwreck depends on a variety of factors. These include the detected characteristics of the individual anomalies (e.g., magnetic anomaly strength and duration, sidescan image configuration) associated with other sidescan or magnetic targets on the same or adjacent lines and relationships to observable target sources, such as channel buoys or pipeline crossings, etc.

MAGNETOMETER

Interpretation of data collected by the magnetometer, the tool of choice by the underwater archaeologist for locating shipwrecks, is perhaps the most problematic. Magnetic anomalies are evaluated and prioritized based on magnetic amplitude or deflection of nanotesla intensity from the ambient background in concert with duration or spatial extent (distance in feet along a trackline of an anomaly influences the ambient background); they are also correlated with sidescan targets. Because the sonar record gives a visible indication of the target, identification or evaluation of potential significance is based on visible target shape, size, and presence of structure, as well as association with magnetic anomalies. Targets, such as isolated sections of pipe, can normally be immediately discarded as non-significant, while large areas of above-sediment wreckage are generally easy to identify.

Several authors have discussed the problems of differentiating between modern debris and shipwrecks, based on remote sensing data. This difficulty is particularly true in the case of magnetic data; therefore, it has received the most attention in the current body of literature dealing with the subject. Pearson and Saltus (1990:32) state “even though a considerable body of magnetic signature data for shipwrecks is now available, it is impossible to positively associate any specific signature with a shipwreck or any other feature.” There is no doubt that the only positive way to verify a magnetic source object is through physical examination. With that said, however, the size and complexity of a magnetic signature does provide a usable key for distinguishing between modern debris and shipwreck remains (see also Garrison et al. 1989; Irion and Bond 1984; Pearson et al. 1993). Specifically, the magnetic signatures of most shipwrecks tend to be large in area and tend to display multiple magnetic peaks of differing amplitude.

In a study conducted for the Minerals Management Service for magnetic anomalies in the northern Gulf of Mexico, Garrison et al. (1989) indicate that a shipwreck signature will cover an area between 10,000 and 50,000 square meters. Using the Garrison et al. (1989) study, as well as years of “practical experience,” in an effort to assess potential significance of remote sensing

targets, the Pearson et al. (1991) study developed general characteristics of magnetometer signatures most likely to represent shipwrecks. The report states that “the amplitude of magnetic anomalies associated with shipwrecks varies considerably, but, in general, the signature of large watercraft or portions of watercraft, range from moderate to high intensity (> 50 nanoteslas) when the sensor is at distances of 20 feet or so” (Pearson et al. 1991:70). Employing a table of magnetic data from various sources as baseline data, the report goes on to state that “data suggests that at a distance of 20 feet or less, watercraft of moderate size are likely to produce a magnetic anomaly (this would be a complex signature [i.e., a cluster of dipoles and/or monopoles]) greater than 80 or 90 feet across the smallest dimension...” (Pearson et al. 1991:70).

While establishing baseline amounts of amplitude and duration reflective of the magnetic characteristics for a shipwreck site, the report “recognizes that a considerable amount of variability does occur” (Pearson et al. 1991:70). Generated in an effort to test the 50-nanotesla/80-foot criteria and to determine the amount of variability, Table 3-01 lists numerous shipwrecks as well as single and multiple-source objects located by magnetic survey and verified by divers. All shipwrecks met and surpassed the 50-nanotesla/80-foot criteria, with one exception. *Emanuel Point II*’s magnetic deviation falls below the cut off, although duration is above. Subsequent archaeological examinations have determined that *Emanuel Point II* contains very little iron (Greg Cook personal communication 2011). The majority of single-object readings fell below the criteria (with the exception of the pipeline, the two sections of pipe, and one of the seven rocket motors). However, the signature of the pipeline should appear as a linear feature on a magnetic contour map and should not be confused with a single source object. The strengths of the two sections of pipe represent refinement readings that sought to produce the highest reading possible and should perhaps be discounted from the sample. Further, because of their association with the space program, rocket motors, which are single source objects, must be considered potentially significant. While the shipwrecks and most single source objects adhere to the 50-nanotesla/80-foot criteria, the multiple-source objects do not. If all targets listed on the table required prioritization of potential significance based on the 50-nanotesla/80-foot criteria, the two multiple-source object targets would be classified as potentially significant.

Table 3-01. Compilation of magnetic data from various sources.

Vessel (Object)	Type and Size	Magnetic Deviation	Duration (feet)	Reference
Shipwrecks				
<i>La Belle</i>	54-ft. barque longue (1686)	247	90	Arnold 1996
<i>Emanuel Point I</i>	wooden hulled sailing (1559)	110	200	Cook personal communication 2011
<i>Emanuel Point II</i>	wooden hulled sailing (1559)	40	85	Cook personal communication 2011
75-D-91A	18 th -century wooden wreck	140	120	Cox 2005
<i>Egmont Shoalwreck</i>	19 th century Wooden-hulled copper clad sailing vessel	67	160	Krivor 2005
<i>USS Narcissus</i>	Civil War wooden tug	582	176	Krivor 2005
<i>J.D. Hinde</i>	129-ft. wooden sternwheeler	573	110	Gearhart and Hoyt 1990
<i>Utina</i>	267-ft. wooden freighter	690	150	James and Pearson 1991; Pearson and Simmons 1995
<i>Mary Somers</i>	iron-hulled sidewheeler	5000	400	Pearson et al. 1993
<i>Gen C.B. Comstock</i>	177-ft. wooden hopper dredge	200	200	James et al. 1991
<i>Mary</i>	234-ft. iron-hulled sidewheeler	1180	200	Hoyt 1990
<i>El Nuevo Constante</i>	126-ft. wooden collier (1677)	65	250	Pearson et al. 1991
<i>James Stockton</i>	55-ft. wooden schooner	80	130	Pearson et al. 1991

Vessel (Object)	Type and Size	Magnetic Deviation	Duration (feet)	Reference
<i>Homer</i>	148-ft. wooden side-wheeler	810	200	Pearson and Saltus 1990
modern shrimp boat	segment 27-x-5 ft.	350	90	Pearson et al. 1991
Confederate Obstructions	numerous vessels with machinery removed and filled with construction rubble	110	long duration	Irion and Bond 1984
Shrimp Boat	Modern	162	110	Watts 2000
Single Objects				
pipeline	18-in. diameter	1570	200	Duff 1996
Pipe/mast/davit	18 in. by 26 ft.	475	104	Lydecker 2007
Pipe	3 in. by 10 ft.	55	352	Krivor 2005
anchor	6-ft. shaft	30	270	Pearson et al. 1991
iron anvil	150 lbs.	598	26	Pearson et al. 1991
engine block	modern gasoline	357	60	Rogers et al. 1990
steel drum	55 gal.	191	35	Rogers et al. 1990
pipe	8 ft. long, 3 in. diameter	121	40	Rogers et al. 1990
railroad rail segment	4-ft. section	216	40	Rogers et al. 1990
7 Rocket Motors	8–34 ft. in length	61 to 422	75 to 180	Watts 2000
Multiple Objects				
anchor/wire rope	8-ft. modern stockless/large coil	910	140	Rogers et al. 1990
cable and chain	5 ft.	30	50	Pearson et al. 1991
scattered ferrous metal	14-x-3 ft.	100	110	Pearson et al. 1991

While the 50-nanotesla/80-foot criteria is a good general guide for most conditions, several recent studies have suggested that a 50-nanotesla/80-foot duration applied to remote sensing data as a baseline for all wreck sites is much too low. Allowing for a larger and more focused database on which to assess signature characteristics of specific vessel classes, the findings from these investigations argue for higher nanotesla and duration criteria for specific types of sites. Table 3-02 indicates the sizable magnetic deviation and duration of previously recorded and located steamboat wreck sites. However, there is one exception, each of the known steamboat wrecks investigated has a magnetic deviation of at least 500 nanoteslas and a duration of no fewer than 110 feet, usually in the 200-plus feet range. As opposed to single objects, steamboat wrecks documented during previous investigations are generally much larger in magnetic strength (although not always), tend to have a longer duration, and typically have multi-component signatures. It should be noted, however, that each steamboat wreck signature differs markedly due to environmental conditions, amount of hull/machinery remaining, and the depth of water/overburden over the wreck site.

Furthermore, it should be inferred that one of the biggest influences on a wreck site's magnetic signature is directly related to the distance from the magnetometer sensor to the wreck site. As Pearson and Birchett state:

“For a typical iron object, the intensity of its magnetic signature [i.e., anomaly] is inversely proportional to the cube of the distance. One pound of iron, for example, would produce an anomaly of 100 gammas at a distance of 2 feet. At a distance of 10 feet the same pound of iron would produce an anomaly of only 1 gamma. A 1,000-ton ship could produce a 700-gamma

anomaly at 100 feet and a barely discernible 0.7-gamma anomaly at 1,000 feet” [Pearson and Birchett 1999:4-13].

An example of a steamboat wreck that produces a magnetic signature of less than 500 nanoteslas involves the purported *Undine* site investigated by Panamerican in 1999 and 2000. During 1999, remote sensing operations located a magnetic anomaly with a magnetic deflection of 193 nanoteslas with a duration of 300 feet. During the 2000 field investigations, the anomaly was identified as the remnant of a charred steamboat \approx 38–40 feet below the river’s surface, and buried 8 feet below riverbed sediments. Historic records indicate the *Undine* was extensively salvaged after the scuttling incident whereupon everything of value including all iron plating, machinery, and cannon were removed from the wreck, but the hull remained in place (James and Krivor 2000:16-17). While only a small portion of the wreck site was uncovered (due to the extensive amount of overburden) it was evident that little of the hull is extant, only just to the turn of the bilge.

It should also be stated that two of the wreck sites with either small areas of deviation or low nanotesla deflections, the *J.D. Hinde* and the purported *Undine*, represent either partial hull remains (*J.D. Hinde*) or were heavily burned and salvaged (*Undine*). Historic records indicate the *J.D. Hinde* was also salvaged after the wrecking process. Retaining none of her steam machinery or wheels, half of the vessel was no longer present, most likely as a result of dredging; both salvage and dredging the obvious reason for its small magnetic duration (James and Pearson 1993:22). Salvage efforts often sought to remove any cargo as well as any machinery, cannon, anchors, or other goods of value. During the Civil War, the salvage of iron for reuse was often paramount. As stated by John B. Jones on August 11, 1863, “the iron was wanted more than anything else but men” (Black 1958:200). Therefore, it may be speculated that any wreck site that (1) has been salvaged in the past; (2) has been exposed to excessive environmental processes (i.e., current); or (3) has been impacted by channelization efforts (i.e., dredging) will produce a lower nanotesla deflection (due to less ferrous metal on site) than a wreck not exposed to similar processes.

Table 3-02. Magnetic data from steamboat wreck sites.

Vessel (object)	Type and Size	Magnetic Deviation	Duration (feet)	Reference
Shipwrecks				
<i>Star of the West</i>	172-ton ocean-going sidewheel	8,300	400	Krivor et al. 2002
3MO69 (unidentified)	wooden sidewheeler	2,961	299	Buchner and Krivor 2001
<i>Caney Creek Wreck</i>	sidewheeler	2,790	unknown	Hedrick 1998
<i>Mary E. Keene</i>	236-ft. sidewheeler	1,700	220	Robinson 1998
<i>John Walsh</i>	275-ft. sidewheeler	1,602	280	James et al. 2002
<i>New Mattie</i>	130-ft. wooden sternwheeler	1,491	200	Buchner and Krivor 2001
<i>35th Parallel</i>	sidewheeler	1,414	320	Saltus 1993
<i>Scotland</i>	sidewheeler	1,322	200	Kane et al. 1998
“Boiler” wreck (unidentified steamboat)	sidewheeler/sternwheeler (?)	1,164	500	Saltus 1993
Hartford City	150-ton sidewheeler	856	400	Krivor et al. 2002
<i>Mary Somers</i>	iron-hulled sidewheeler	5000	325	Pearson et al. 1993
<i>Homer</i>	148-ft. wooden sidewheeler	810	200	Pearson and Saltus 1993
<i>E.F. Dix/Eastport</i>	sidewheeler/ironclad	800	360	Pearson and Birchett 1995

Vessel (object)	Type and Size	Magnetic Deviation	Duration (feet)	Reference
<i>Choctaw</i>	223-ton sternwheel towboat	797	250	Krivor et al. 2002
<i>J.D. Hinde</i>	129-ft. wooden sternwheeler	573	110	Gearhart and Hoyt 1990
Oklahoma Wreck	sidewheeler	497	300	M.C. Krivor personal communication 2005
<i>Undine</i>	sternwheeler	200	300	James and Krivor 2000

If the signatures of the entire steamboat wrecks listed in Table 6 are averaged, an average magnetic deviation of 1,576 nanoteslas with an average duration of 234 feet is obtained. While the sensor distance, environmental factors, and the amount of ferrous metal remaining on any given steamboat site must be taken into account, previously identified wreck sites have tended to produce sizable +200-nanotesla magnetic deviations with a minimum duration of 110 feet. While the 110-foot duration represents the lowest duration of any of the known steamboat wreck sites, it must be stated that in such cases a portion of the wreck is no longer extant due to previous salvage and dredging/channelization efforts. However, until further surveys show that this short duration is an “anomaly” so to speak, it must be employed as the baseline duration. Similarly, with the exception of the *Undine* site, which as stated previously was heavily salvaged, all other surveyed steamboats have nanotesla deviations approaching 500 nanoteslas or above, but its 200-nanotesla reading must be employed as the baseline amplitude.

While the data indicates the validity of employing specific nanotesla strength and duration criteria when assessing magnetic anomalies, other factors must be taken into account. Pearson and Hudson (1990) have argued that the past and recent use of a water body must be an important consideration in the interpretation of remote sensing data; in many cases, this should supposedly be the most important criterion. Unless the remote sensing data, the historical record, or the specific environment (i.e., harbor entrance channel) provides compelling and overriding evidence, it is otherwise believed that the history of use should be a primary consideration in the interpretation. The constitution of “compelling evidence” is, to some extent, left to the discretion of the researcher; however, in settings where modern commercial traffic and historic use have been intensive, such as the current Project Area, the presence of a large quantity of modern debris must be anticipated. In harbor, bay, or riverine situations where traffic is heavy, this debris will be scattered along the channel right-of-way, although it may be concentrated in areas where traffic would slow or halt, and it will appear on remote sensing survey records as discrete, small objects. This is in fact the case for many of the anomalies recorded during the current investigation.

In addition to anomaly strength and duration considerations, all anomalies were assessed for type (monopole [negative or positive influence], dipole [negative and positive influence], or complex) and association with other magnetic anomalies (i.e., clustering) and sidescan sonar targets. With regard to analysis of these anomalies, relative to potential significance, many will be found to represent a small, single source object (a localized deviation), and are generally identified and labeled as non-significant, especially in an area of high use (however, this is not generally the case with the current environment). As seen on contour maps, the contour lines for this type of anomaly can be seen to approach, or go to but not beyond, the adjacent survey trackline on which it is located. This visual interpretation is corroborated during the analysis of the electronic magnetometer strip-chart data of each survey trackline. An examination of the strip-chart will show that the target was recorded only on a single transect, and that it was not recorded (i.e., did not influence the ambient magnetic background) on adjacent lines. This is especially true when an anomaly’s readings are large deviations but are recorded on only one line. This indicates the source for this target must be a small, discrete object, and the magnetometer sensor must have

passed closely by or directly over the object in order to generate the large readings on this survey line, yet not be recorded or have had an influence on adjacent lines. Because these anomalies represent single source objects, they are not considered representative of a potentially significant submerged cultural resource and are not recommended for avoidance.

It cannot be understated that the majority of anomalies recorded during any survey are generated by debris and not shipwrecks. As stated by Gearhart (2011:91-92), “archaeologists have repeatedly struggled to characterize reliable differences between magnetic signatures of shipwrecks and debris,” employing amplitude, duration (i.e., spatial extent), and complexity of the signature as vague defining criteria, along with judgmental experience, and further states that “present methods for marine magnetic data interpretation are uncertain at best and scientifically unfounded at worst.” However, and as will be discussed, the employment of induced magnetism identified over twenty years ago as a potential defining characteristic of an anomaly, can eliminate many anomalies from consideration as shipwrecks.

In Garrison et al.’s 1989 study to establish an interpretive framework that would help identify the nature of magnetic anomalies, it was predicted correctly that anomalies caused by debris might be differentiated from shipwreck anomalies based on the contrast between permanent and induced magnetism. The study states:

“While it may not be analytically possible to contrast iron and steel by remnant magnetization one may be able to characterize anomalies as to their inductive magnetization...The argument here would rely on the structural complexity of a shipwreck having a large or detectable inductive magnetization. Anomalies without this component could be classified as exclusively ferromagnetic features and by local extension debris” [Garrison et al. 1989:2:224].

In his article entitled *Archaeological Interpretation of Marine Magnetic Data*, Gearhart (2011) expands on Garrison et al.’s 1998 premise and convincingly shows that while “one cannot distinguish between the anomaly produced by a shipwreck and one produced by a similarly complex concentration of magnetic debris...shipwreck anomalies can be characterized by their induced magnetic fields and are distinguishable from a significant proportion of simple-source anomalies.” He goes on to state, “the most important parameter to consider when interpreting anomalies based on magnetic induction is the direction of magnetic moment” (Gearhart 2011:106) and “deviation from the northerly magnetic moment direction, common to all induced anomalies, has proven to be the single most powerful discriminator between simple-source anomalies and complex-source anomalies, including shipwrecks” (Gearhart 2011:102).

In simplistic terms, the contour map of the magnetic moment of an induced anomaly will have its negative value to the north and its positive value to the south. Gearhart presents contours of numerous known wreck and debris anomalies and illustrates that magnetic moments of shipwrecks (in the earth’s northern hemisphere) are oriented to the north (no more than a 26-degree deviation), as are those of complex debris sites (i.e., large areas of wire rope), while those of simple-source debris anomalies are not. He concludes by suggesting ± 20 degrees from magnetic north as an orientation that will allow the successful differentiation of simple-source debris anomalies from most complex-source anomalies and virtually all shipwrecks (Gearhart 2011). In testing this predicted characteristic, we reviewed data from several past surveys and anomaly and wreck investigations (Krivor 2005; Lydecker 2007, James et al. 2002). While not an exhaustive review, we found these same principles apply with no deviation from Gearhart’s findings and leads us to also conclude that identifying and categorizing the magnetic moment of an induced anomaly does allow the researcher the ability to differentiate a large percentage of debris source anomalies from potentially significant resources during analysis. A case in point is the recent diver investigation of 13 magnetic anomalies in the Skyway Gulf Intracoastal Waterway (James et al. 2011). Employing the above criteria of inclination of magnetic moment, of the 13 magnetic anomalies investigated, seven anomalies had magnetic moments that did not

meet the characteristics of complex-source anomalies including shipwrecks, but rather had signatures representative of simple-source debris. Subsequent diver investigation clearly showed that these anomalies did indeed represent debris and were not significant. Representing over half the total number of anomalies, if this inclination of magnetic moment method had been employed they would not have been recommended for avoidance or subsequent investigation. The remaining six anomalies that had magnetic moment characteristics indicative of shipwrecks or complex debris sites were also found to represent debris (James et al. 2011). This, however, is not unexpected given that this method does not rule out complex source debris anomalies or all simple-source debris anomalies, just a much larger percentage than would have been ruled out if the method had not been employed.

While there may be hesitation to adopt the inclination of magnetic moment characteristic, it is recommended that it at least be applied to any interpretive analysis and assessed overtime as to its veracity. It will, we firmly believe, be proven and accepted. The end result will effectively be the reduction of a significant number of anomalies currently recommended for avoidance or subsequent investigation.

SIDESCAN SONAR

In contrast to magnetic data, sidescan interpretation is less problematic, as objects are reconstructed as they look to the eye. Targets, such as isolated sections of pipe, can normally be immediately discarded as non-significant, while large areas of above-sediment wreckage, as well as some exposed potential paleofeatures (i.e., rock outcrops) are generally apparent. The chief factors considered in analyzing sidescan data, with regard to wreckage, include: linearity; height off bottom; size; associated magnetics; and environmental context. Since historic resources in the form of shipwrecks usually contain large amounts of ferrous compounds, complex sidescan targets with complex magnetic anomalies are of the greatest importance.

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IV. INVESTIGATIVE FINDINGS

A total of 282 magnetic anomalies and 174 sidescan sonar contacts were recorded during the current survey. Employing the above discussions on target analysis, magnetic anomalies were assessed for potential significance based on magnetic deviation (above and/or below ambient background), duration (distance in feet along a trackline an anomaly influences the ambient background), size relative to being detected on more than one transect, type (monopole [negative or positive influence], dipole [negative and positive influence], or complex), association with other magnetic anomalies (i.e., clustering) and/or sidescan sonar targets, and direction of magnetic moment. Sidescan sonar contacts, as visual images, were assessed for structure, linearity, height off bottom, size, associated magnetics, and environmental context.

MAGNETOMETER RESULTS

As listed in Tables 4-01 and 4-02 and illustrated in Figures 4-02–4-10, 282 magnetic anomalies with variations of approximately 1 nanotesla or higher were recorded during the investigation within the survey area. Of these, 153 are located in the ODMDS survey area (M001–M153) and 129 in the channel survey area (M154–M282). Tables 4-01 and 4-02 include: target location; type (i.e., monopole, dipole, complex); nanotesla deviation and duration; and association with other targets (both magnetic and sidescan) from the current survey. The magnetic contour maps are presented at a 10-nanotesla contour, although given the large survey interval in the ODMDS, magnetic data for that part of the survey was not contoured.

Based in part on the anomaly signature (i.e., amplitude, deviation, clustering, etc.) and/or sidescan target association: three of the recorded anomalies are associated with navigation aids; two represent sunken modern vessels; 245 represent single-source objects; five are small debris; 26 are unknowns; and one is associated with a submerged breakwater, FMSF site 8BD4255, located just outside the southern edge of the channel survey area. Presented below are anomalies by group.

Navigation Aids/Markers: M251, M252, M265

Single Source: M001–M016, M018–M030, M032–M037, M039–M048, M050–M056, M058–M070, M073–M088, M090–M098, M100–M110, M113, M114, M116–M155, M157–M160, M162, M164–M170, M172, M173, M175, M178, M179, M181–M186, M188–M196, M198–M208, M211–M214, M216–M225, M228–M233, M235–M242, M244–M250, M253–M260, M263, M264, M267–M277, M278, M281, M282

Sunken Modern Vessels: M057, M215

Submerged Breakwater: M156 (8BD4255)

Debris: M038, M176, M177, M227, M266

Unknowns: M017, M031, M049, M071, M072, M089, M099, M111, M112, M115, M161, M163, M171, M174, M180, M187, M197, M209, M210, M226, M234, M243, M261, M262, M278, M280

Table 4-01. ODMDS Magnetic Anomalies.

Anomaly	Map Number	Easting	Northing	Duration (ft)	Deviation (nT)	Type	Associations	Recommended	Description
M001	Map 7	975564.08	652792.84	32.87	2.20	Dipole		N	single source
M002	Map 2	973689.69	657591.88	35.89	7.10	Dipole		N	single source
M003	Map 2	973663.01	659191.01	18.96	8.64	Complex Dipole		N	single source
M004	Map 2	973666.72	659378.08	67.32	1.36	Dipole		N	single source
M005	Map 2	973676.76	658507.55	52.82	2.39	Monopole		N	single source
M006	Map 5	978488.30	654141.73	39.44	4.67	Dipole		N	single source
M007	Map 7	975385.02	651640.88	38.58	3.50	Dipole		N	single source
M008	Map 7	975282.26	653166.99	101.05	8.54	Complex Dipole		N	single source
M009	Map 3	978115.21	657608.29	13.25	2.69	Dipole		N	single source
M010	Map 3	974951.41	656697.55	32.87	1.71	Complex Dipole		N	single source
M011	Map 3	974947.70	657135.69	35.30	1.61	Dipole		N	single source
M012	Map 3	974950.78	657442.55	30.38	2.62	Dipole		N	single source
M013	Map 3	974953.87	657559.06	74.74	7.82	Complex Dipole		N	single source
M014	Map 3	974942.38	657874.95	32.81	3.56	Dipole		N	single source
M015	Map 5	974532.14	656080.54	23.82	2.17	Complex Dipole		N	single source
M016	Map 5	974544.02	656654.88	123.16	2.74	Monopole		N	single source
M017	Map 2	974558.16	657091.38	123.26	18.79	Complex Dipole		N	unknown
M018	Map 5	976819.66	653968.60	43.57	4.01	Complex Dipole		N	single source
M019	Map 2	974070.20	658846.41	28.74	4.17	Dipole		N	single source
M020	Map 2	974078.41	658737.28	10.70	17.71	Dipole		N	single source
M021	Map 2	974056.84	658596.16	29.20	13.59	Dipole		N	single source
M022	Map 2	974028.36	658402.52	33.40	20.47	Complex Dipole		N	single source
M023	Map 4	973977.49	656087.93	11.09	30.60	Dipole		N	single source
M024	Map 5	974151.00	655398.71	14.96	7.86	Complex Dipole		N	single source
M025	Map 5	974136.86	655300.26	34.19	28.53	Dipole		N	single source
M026	Map 6	973892.75	653087.40	29.59	3.20	Dipole		N	single source
M027	Map 2	973685.39	660077.96	34.45	5.83	Dipole		N	single source
M028	Map 2	973668.36	659169.68	72.24	0.93	Complex Dipole		N	single source
M029	Map 2	973674.50	659309.98	57.41	0.54	Dipole		N	single source
M030	Map 2	973663.63	657520.50	221.65	4.52	Complex Dipole		N	single source
M031	Map 7	975867.89	653097.25	40.22	113.28	Dipole		N	unknown
M032	Map 6	973076.79	652222.60	44.42	2.80	Complex Dipole		N	single source
M033	Map 8	973114.10	649936.72	89.44	3.39	Complex Dipole		N	single source
M034	Map 8	973107.77	648544.36	154.40	3.05	Complex Dipole		N	single source
M035	Map 7	976414.93	651407.86	25.46	1.73	Complex Dipole		N	single source
M036	Map 7	976469.51	653549.33	54.13	1.56	Complex Dipole		N	single source
M037	Map 5	976470.13	655529.99	55.77	5.53	Complex Dipole		N	single source

Anomaly	Map Number	Easting	Northing	Duration (ft)	Deviation (nT)	Type	Associations	Recommended	Description
M038	Map 5	976466.42	656117.46	45.14	5.04	Complex Dipole	C023	Y	debris
M039	Map 2	974041.88	658434.52	74.67	18.59	Complex Dipole		N	single source
M040	Map 2	974043.72	658297.50	32.02	12.43	Dipole		N	single source
M041	Map 4	974013.36	656014.08	65.42	3.02	Complex Dipole		N	single source
M042	Map 4	974018.90	655434.00	22.18	1.77	Dipole		N	single source
M043	Map 4	973983.82	654693.92	111.09	2.48	Complex Dipole		N	single source
M044	Map 9	971267.61	645975.41	31.50	7.65	Dipole		N	single source
M045	Map 8	971250.77	649678.27	34.45	3.93	Complex Dipole		N	single source
M046	Map 8	971265.77	650037.64	40.22	8.77	Complex Dipole		N	single source
M047	Map 6	971269.87	652137.27	82.09	2.41	Dipole		N	single source
M048	Map 6	971270.27	652336.65	70.54	5.56	Complex Dipole		N	single source
M049	Map 6	971270.27	652802.69	49.21	39.68	Dipole		N	unknown
M050	Map 6	971268.00	653167.81	57.41	4.62	Complex Dipole		N	single source
M051	Map 6	971276.01	653362.26	56.69	2.54	Complex Dipole		N	single source
M052	Map 6	971277.26	653597.74	70.54	7.36	Complex Dipole		N	single source
M053	Map 2	972767.04	657062.67	60.70	10.68	Complex Dipole		N	single source
M054	Map 4	972761.10	655381.48	21.39	3.52	Complex Dipole		N	single source
M055	Map 4	972764.18	655273.18	33.66	3.00	Complex Dipole		N	single source
M056	Map 4	972765.20	654995.03	35.37	1.94	Dipole		N	single source
M057	Map 4	972766.64	654314.85	208.79	10.84	Complex Dipole	C033	N	small boat modern
M058	Map 9	970890.38	645932.74	100.39	10.99	Complex Dipole		N	single source
M059	Map 9	970886.90	646944.40	31.17	3.40	Complex Dipole		N	single source
M060	Map 9	970920.74	645868.74	58.33	5.61	Complex Dipole		N	single source
M061	Map 9	970861.04	647069.94	37.73	2.36	Complex Dipole		N	single source
M062	Map 9	970860.65	647407.16	50.07	2.74	Complex Dipole		N	single source
M063	Map 8	970874.79	648467.23	124.80	2.64	Complex Dipole		N	single source
M064	Map 8	970867.02	649573.25	56.63	2.93	Complex Dipole		N	single source
M065	Map 8	970869.48	649861.24	144.36	2.39	Complex Dipole		N	single source
M066	Map 6	970869.48	650814.65	95.14	3.60	Complex Dipole		N	single source
M067	Map 6	970880.54	651616.26	27.82	1.35	Complex Dipole		N	single source
M068	Map 6	970875.81	652064.25	36.94	4.11	Dipole		N	single source
M069	Map 6	970876.04	653592.82	86.22	12.03	Dipole		N	single source
M070	Map 4	970881.78	654670.94	40.22	2.64	Dipole		N	single source
M071	Map 4	970892.84	655294.51	28.74	21.77	Complex Dipole		N	unknown
M072	Map 4	970888.94	655363.43	41.93	36.99	Complex Dipole		N	unknown
M073	Map 4	970890.58	655482.40	32.81	11.94	Dipole		N	single source
M074	Map 2	970892.22	657094.66	35.37	16.05	Dipole		N	single source

Anomaly	Map Number	Easting	Northing	Duration (ft)	Deviation (nT)	Type	Associations	Recommended	Description
M075	Map 2	970886.28	657453.22	40.22	8.91	Dipole		N	single source
M076	Map 2	972435.17	658896.46	63.25	4.26	Complex Dipole		N	single source
M077	Map 2	972445.63	658678.21	148.69	5.95	Complex Dipole		N	single source
M078	Map 2	972445.01	656873.13	44.36	5.68	Complex Dipole		N	single source
M079	Map 2	972444.19	656715.60	38.39	3.91	Complex Dipole		N	single source
M080	Map 4	972425.52	655283.85	37.86	7.12	Complex Dipole		N	single source
M081	Map 8	972433.72	648595.23	28.08	8.29	Dipole		N	single source
M082	Map 8	972405.20	647657.41	43.50	11.67	Dipole		N	single source
M083	Map 9	972368.51	647333.32	60.83	2.93	Dipole		N	single source
M084	Map 8	972393.12	649480.53	37.20	1.47	Dipole		N	single source
M085	Map 8	970519.95	648262.93	32.81	2.29	Complex Dipole		N	single source
M086	Map 8	970520.15	648348.26	43.50	2.05	Complex Dipole		N	single source
M087	Map 6	970515.42	650932.80	33.66	2.37	Dipole		N	single source
M088	Map 6	970531.01	651371.76	48.49	1.47	Complex Dipole		N	single source
M089	Map 6	970513.15	652408.04	103.41	18.53	Complex Dipole		N	unknown
M090	Map 6	970507.84	652861.77	28.74	5.23	Complex Dipole		N	single source
M091	Map 4	970527.33	654021.94	59.06	4.55	Complex Dipole		N	single source
M092	Map 4	970520.97	654661.10	46.78	1.08	Dipole		N	single source
M093	Map 4	970520.15	654796.48	77.95	0.92	Dipole		N	single source
M094	Map 4	970516.67	655553.79	29.53	1.57	Dipole		N	single source
M095	Map 4	970524.05	656582.68	50.07	3.27	Dipole		N	single source
M096	Map 2	970526.09	657598.44	56.63	1.55	Complex Dipole		N	single source
M097	Map 2	970515.62	658043.97	56.63	1.60	Complex Dipole		N	single source
M098	Map 2	970511.74	659610.28	59.91	2.22	Dipole		N	single source
M099	Map 2	972100.80	658414.01	62.60	41.60	Dipole		N	unknown
M100	Map 2	972103.26	657961.92	32.81	4.16	Dipole		N	single source
M101	Map 4	972080.29	655666.19	32.81	6.99	Dipole		N	single source
M102	Map 6	972076.41	651877.18	32.02	6.37	Complex Dipole		N	single source
M103	Map 8	972083.57	648308.06	58.27	1.63	Complex Dipole		N	single source
M104	Map 8	972088.72	648089.81	23.88	2.50	Complex Dipole		N	single source
M105	Map 9	972087.67	647380.08	46.78	14.87	Complex Dipole		N	single source
M106	Map 8	970193.39	648103.75	34.45	3.80	Complex Dipole		N	single source
M107	Map 6	970204.26	650848.29	34.45	13.65	Complex Dipole		N	single source
M108	Map 6	970217.19	651235.56	24.87	2.39	Complex Dipole		N	single source
M109	Map 6	970216.56	652522.90	111.55	5.19	Complex Dipole		N	single source
M110	Map 4	970194.21	654720.17	51.71	3.00	Complex Dipole		N	single source
M111	Map 4	970197.50	656064.95	39.11	34.24	Complex Dipole		N	unknown
M112	Map 2	970190.51	658220.37	45.14	35.79	Dipole		N	unknown

Anomaly	Map Number	Easting	Northing	Duration (ft)	Deviation (nT)	Type	Associations	Recommended	Description
M113	Map 2	971776.71	658670.82	48.43	15.00	Complex Dipole		N	single source
M114	Map 4	971786.98	655310.92	39.44	2.18	Dipole		N	single source
M115	Map 6	971791.90	652184.86	45.54	74.07	Dipole		N	unknown
M116	Map 6	971823.08	650908.18	24.15	6.08	Dipole		N	single source
M117	Map 8	971793.54	650489.73	15.62	7.76	Complex Dipole		N	single source
M118	Map 8	971783.50	650353.53	29.46	3.58	Complex Dipole		N	single source
M119	Map 9	969964.25	645778.49	31.50	1.91	Dipole		N	single source
M120	Map 6	969909.70	651074.74	77.10	3.24	Dipole		N	single source
M121	Map 6	969909.51	652130.71	65.62	2.56	Dipole		N	single source
M122	Map 6	969924.27	652878.17	108.27	2.61	Monopole		N	single source
M123	Map 6	969918.30	653325.34	27.89	1.73	Complex Dipole		N	single source
M124	Map 6	969920.76	653491.90	59.91	1.53	Complex Dipole		N	single source
M125	Map 4	969923.03	654992.57	31.17	5.13	Dipole		N	single source
M126	Map 4	969918.10	655429.07	45.93	7.75	Dipole		N	single source
M127	Map 2	969912.79	657237.43	57.41	1.62	Complex Dipole		N	single source
M128	Map 2	969931.03	657536.09	40.22	4.43	Dipole		N	single source
M129	Map 2	969918.10	657738.75	48.43	10.64	Complex Dipole		N	single source
M130	Map 2	969923.85	659026.91	36.94	4.89	Complex Dipole		N	single source
M131	Map 2	969925.69	659170.50	38.65	3.92	Complex Dipole		N	single source
M132	Map 2	969909.90	659862.17	29.59	1.25	Complex Dipole		N	single source
M133	Map 2	971457.54	660132.11	80.38	3.59	Complex Dipole		N	single source
M134	Map 2	971482.97	659497.05	34.51	6.87	Dipole		N	single source
M135	Map 2	971452.84	659095.84	64.11	10.75	Complex Dipole		N	single source
M136	Map 2	971490.36	658241.71	45.21	2.84	Complex Dipole		N	single source
M137	Map 2	971473.95	657952.89	26.71	1.52	Dipole		N	single source
M138	Map 4	971468.43	655067.24	29.99	5.16	Dipole		N	single source
M139	Map 4	971472.54	654798.12	46.78	2.30	Dipole		N	single source
M140	Map 4	971447.49	654666.84	76.44	1.67	Complex Dipole		N	single source
M141	Map 6	971465.15	653451.70	102.56	2.64	Complex Dipole		N	single source
M142	Map 6	971470.66	653240.83	34.45	4.91	Dipole		N	single source
M143	Map 8	971489.54	649997.44	12.34	8.78	Complex Dipole		N	single source
M144	Map 8	971458.78	649536.33	103.74	1.99	Monopole		N	single source
M145	Map 9	971449.14	647368.60	51.38	4.24	Dipole		N	single source
M146	Map 9	971463.51	646440.62	51.71	2.07	Dipole		N	single source
M147	Map 7	976184.17	653195.70	121.39	2.66	Complex Dipole		N	single source
M148	Map 7	976214.96	652757.56	41.01	1.70	Dipole		N	single source
M149	Map 7	978898.35	653215.40	29.59	1.28	Dipole		N	single source
M150	Map 5	978843.18	654673.40	55.38	1.08	Dipole		N	single source

Anomaly	Map Number	Easting	Northing	Duration (ft)	Deviation (nT)	Type	Associations	Recommended	Description
M151	Map 7	976214.96	652757.56	41.01	1.68	Dipole		N	single source
M152	Map 7	976184.60	653255.60	117.32	2.66	Complex Dipole		N	single source
M153	Map 5	978112.12	654795.66	39.50	1.13	Dipole		N	single source

Table 4-02. Channel Magnetic Anomalies.

Anomaly	Map Number	Easting	Northing	Duration (ft.)	Deviation (nT)	Type	Associations	Recommended	Description
M154	Map 1	952255.26	640563.89	26.00	149.98	Dipole		N	single source
M155	Map 1	952796.45	640577.41	33.00	76.42	Dipole		N	single source
M156	Map 1	952934.00	640573.74	74.00	436.39	Dipole	AWOI S 9907	N	submerged breakwater BD4255
M157	Map 1	953042.60	640572.49	9.65	9.13	Complex Dipole		N	single source
M158	Map 1	954305.75	640586.44	19.88	18.45	Complex Dipole		N	single source
M159	Map 1	954663.78	640593.00	26.25	14.89	Complex Dipole		N	single source
M160	Map 1	954827.39	640598.75	8.40	30.22	Dipole		N	single source
M161	Map 1	955030.44	640599.57	43.00	75.39	Complex Dipole		N	unknown
M162	Map 1	955513.09	640608.20	5.97	19.19	Dipole		N	single source
M163	Map 1	955773.31	640615.98	40.00	422.34	Complex Dipole		N	unknown
M164	Map 1	956099.87	640615.98	15.29	12.21	Complex Dipole		N	single source
M165	Map 1	956374.11	640620.08	11.22	21.56	Complex Dipole		N	single source
M166	Map 1	956667.32	640636.49	23.03	6.17	Complex Dipole		N	single source
M167	Map 1	956764.86	640629.93	31.63	6.64	Complex Dipole		N	single source
M168	Map 1	957349.67	641041.42	14.37	3.68	Dipole		N	single source
M169	Map 1	957258.99	641044.27	12.73	13.89	Complex Dipole		N	single source
M170	Map 1	957021.67	641031.14	7.94	18.54	Complex Dipole		N	single source
M171	Map 1	956759.54	641019.26	46.00	98.77	Dipole		N	unknown
M172	Map 1	955844.17	641016.38	16.21	14.38	Dipole		N	single source
M173	Map 1	955649.71	641014.73	13.32	12.10	Dipole		N	single source
M174	Map 1	955251.25	641004.07	40.00	60.28	Complex Dipole		N	unknown
M175	Map 1	954813.11	641004.89	8.60	8.04	Dipole		N	single source

Anomaly	Map Number	Easting	Northing	Duration (ft.)	Deviation (nT)	Type	Associations	Recommended	Description
M176	Map 1	954721.74	640999.15	45.00	34.30	Complex Dipole	M177, M227, M266, C116	Y	vicinity of bouy, debris on SS
M177	Map 1	954608.61	640995.86	62.00	187.53	Dipole	M176, M227, M266, C116	Y	vicinity of bouy, debris on SS
M178	Map 1	954359.18	640994.22	19.69	15.85	Complex Dipole		N	single source
M179	Map 1	953354.09	640981.92	42.65	15.55	Complex Dipole		N	single source
M180	Map 1	953287.73	640983.56	32.87	21.29	Complex Dipole	C096	N	unknown
M181	Map 1	952369.50	640970.43	11.09	7.42	Dipole	M182, C088	N	single source
M182	Map 1	952302.22	640972.89	28.28	5.28	Complex Dipole	M181, C088	N	single source
M183	Map 1	956556.35	640721.43	13.39	16.57	Dipole		N	single source
M184	Map 1	956498.20	640723.46	6.96	16.58	Dipole		N	single source
M185	Map 1	956080.57	640712.80	21.00	50.95	Dipole		N	single source
M186	Map 1	955672.06	640710.33	8.79	329.12	Dipole		N	single source
M187	Map 1	955048.39	640697.21	38.00	86.90	Complex Dipole		N	unknown
M188	Map 1	955006.02	640695.56	78.22	66.90	Complex Dipole		N	single source
M189	Map 1	953174.83	640684.90	12.73	9.08	Dipole		N	single source
M190	Map 1	953273.28	640676.69	29.99	9.09	Complex Dipole		N	single source
M191	Map 1	952812.04	640671.38	8.46	10.11	Complex Dipole		N	single source
M192	Map 1	952587.55	640670.95	24.28	6.65	Complex Dipole		N	single source
M193	Map 1	952420.27	640660.28	21.13	21.74	Complex Dipole		N	single source
M194	Map 1	952338.32	640657.00	23.36	17.18	Complex Dipole	M195, C086	N	single source
M195	Map 1	952261.20	640657.00	18.90	10.47	Complex Dipole	M194, C086	N	single source
M196	Map 1	957360.14	640939.25	9.06	4.16	Dipole		N	single source
M197	Map 1	956956.46	640935.97	47.00	214.24	Complex Dipole		N	unknown
M198	Map 1	956581.59	640914.64	12.53	13.31	Complex Dipole	C147	N	single source
M199	Map 1	955993.50	640915.46	12.07	6.98	Complex Dipole		N	single source
M200	Map 1	955631.47	640913.81	22.00	23.83	Dipole		N	single source
M201	Map 1	954877.54	640895.37	25.00	44.86	Dipole		N	single source
M202	Map 1	954303.00	640895.76	25.00	74.59	Dipole		N	single source
M203	Map 1	953880.64	640888.38	16.86	21.50	Complex Dipole		N	single source
M204	Map 1	953376.24	640878.53	18.90	28.71	Complex Dipole		N	single source
M205	Map 1	953113.29	640876.07	7.81	5.45	Dipole		N	single source
M206	Map 1	952999.34	640871.15	31.00	40.32	Complex Dipole		N	single source

Anomaly	Map Number	Easting	Northing	Duration (ft.)	Deviation (nT)	Type	Associations	Recommended	Description
M207	Map 1	952821.88	640869.51	8.01	5.52	Dipole		N	single source
M208	Map 1	953406.40	640471.18	22.57	7.21	Complex Dipole		N	single source
M209	Map 1	953922.29	640483.49	42.00	100.45	Dipole		N	unknown
M210	Map 1	954024.23	640498.65	27.00	62.85	Dipole		N	unknown
M211	Map 1	954217.86	640495.79	5.38	32.28	Complex Dipole		N	single source
M212	Map 1	954456.72	640496.19	16.40	4.43	Dipole		N	single source
M213	Map 1	954502.97	640495.37	22.57	6.36	Complex Dipole		N	single source
M214	Map 1	954561.45	640495.37	22.31	15.42	Complex Dipole		N	single source
M215	Map 1	954716.10	640496.19	27.49	17.81	Complex Dipole	C118, AWOI S 8482	N	AWOIS 8482 modern vessel
M216	Map 1	954794.14	640497.83	11.68	18.45	Dipole		N	single source
M217	Map 1	954981.64	640501.93	7.61	26.07	Dipole		N	single source
M218	Map 1	955138.94	640499.89	65.00	4.00	Dipole		N	single source
M219	Map 1	955747.45	640509.31	18.04	4.83	Complex Dipole		N	single source
M220	Map 1	955821.00	640516.30	17.19	11.05	Complex Dipole		N	single source
M221	Map 1	956071.84	640531.89	8.46	28.62	Dipole		N	single source
M222	Map 1	956117.39	640526.54	9.78	11.54	Dipole		N	single source
M223	Map 1	956193.99	640515.88	20.00	11.48	Dipole	C140	N	single source
M224	Map 1	956262.62	640510.96	10.43	31.87	Dipole	C141	N	single source
M225	Map 1	956532.86	640529.43	30.00	54.64	Dipole	C146	N	single source
M226	Map 1	955179.38	641104.59	85.00	270.04	Complex Dipole	M261, M262	Y	unknown
M227	Map 1	954667.39	641086.12	110.00	1139.56	Dipole	M176, M177, M266, C116	Y	vicinity of buoy, debris on SS
M228	Map 1	957118.91	641099.25	4.92	11.01	Monopole		N	single source
M229	Map 1	956839.95	641140.27	18.50	13.51	Complex Dipole		N	single source
M230	Map 1	956830.66	641141.09	2.95	11.47	Monopole		N	single source
M231	Map 1	956053.92	641119.36	23.00	38.83	Dipole	C135	N	single source
M232	Map 1	955096.71	641103.35	14.17	16.30	Dipole		N	single source
M233	Map 1	954796.93	641092.68	27.89	23.00	Complex Dipole		N	single source
M234	Map 1	954442.05	641098.42	48.00	53.24	Complex Dipole		N	unknown
M235	Map 1	954323.28	641086.94	20.73	24.76	Complex Dipole		N	single source
M236	Map 1	954106.57	641077.09	16.40	8.66	Complex Dipole		N	single source
M237	Map 1	953990.16	641085.30	6.96	8.04	Dipole		N	single source
M238	Map 1	953698.49	641075.06	12.73	15.36	Dipole		N	single source
M239	Map 1	957173.46	640451.88	22.00	58.35	Complex Dipole		N	single source

Anomaly	Map Number	Easting	Northing	Duration (ft.)	Deviation (nT)	Type	Associations	Recommended	Description
M240	Map 1	956769.98	640439.57	18.11	15.69	Dipole		N	single source
M241	Map 1	956418.81	640423.98	5.77	19.58	Dipole		N	single source
M242	Map 1	956268.46	640433.83	23.82	16.88	Complex Dipole		N	single source
M243	Map 1	956118.94	640428.91	55.00	315.71	Complex Dipole		N	unknown
M244	Map 1	956006.33	640410.04	22.57	12.89	Complex Dipole		N	single source
M245	Map 1	955938.82	640414.96	11.09	7.63	Complex Dipole		N	single source
M246	Map 1	955847.55	640419.88	22.18	30.68	Complex Dipole		N	single source
M247	Map 1	955478.76	640410.04	22.57	11.79	Complex Dipole		N	single source
M248	Map 1	955288.99	640419.88	14.04	8.29	Dipole		N	single source
M249	Map 1	955172.81	640394.87	25.00	37.53	Complex Dipole		N	single source
M250	Map 1	955128.28	640400.19	0.59	31.64	Complex Dipole		N	single source
M251	Map 1	954928.08	640418.24	24.00	71.69	Dipole	M252, C120	N	channel marker
M252	Map 1	954902.64	640416.21	30.00	105.85	Dipole	M251, C120	N	channel marker
M253	Map 1	954693.55	640391.16	14.83	7.74	Complex Dipole		N	single source
M254	Map 1	954652.10	640386.24	6.76	13.03	Dipole		N	single source
M255	Map 1	954251.90	640360.41	21.72	4.86	Complex Dipole		N	single source
M256	Map 1	957153.05	641207.98	26.00	32.92	Dipole	C153	N	single source
M257	Map 1	957078.45	641221.50	16.00	23.85	Dipole	C150	N	single source
M258	Map 1	956995.41	641232.16	30.00	138.31	Complex Dipole		N	single source
M259	Map 1	955999.96	641202.23	13.12	9.38	Dipole	M260, C134	N	single source
M260	Map 1	955882.31	641200.59	11.29	12.83	Dipole	M259, C134	N	single source
M261	Map 1	955177.21	641192.78	50.00	34.89	Dipole	M226, M262	Y	unknown
M262	Map 1	955140.58	641192.78	3.08	382.65	Dipole	M226, M261	Y	unknown unknown
M263	Map 1	955074.65	641189.50	11.61	8.52	Complex Dipole		N	single source
M264	Map 1	955024.80	641186.22	33.27	16.55	Complex Dipole		N	single source
M265	Map 1	954855.78	641153.40	60.00	309.54	Complex Dipole		N	channel marker
M266	Map 1	954670.35	641070.13	120.00	912.31	Dipole	M176, M177, M227, C116	Y	vicinity of bouy, debris on SS
M267	Map 1	952160.47	640744.79	17.91	28.25	Complex Dipole		N	single source
M268	Map 1	952796.58	640769.41	12.73	14.16	Dipole	C091	N	single source
M269	Map 1	952870.82	640774.33	7.94	6.34	Dipole		N	single source
M270	Map 1	954258.56	640796.09	28.00	45.21	Dipole		N	single source

Anomaly	Map Number	Easting	Northing	Duration (ft.)	Deviation (nT)	Type	Associations	Recommended	Description
M271	Map 1	954456.82	640798.95	14.04	22.23	Complex Dipole		N	single source
M272	Map 1	954669.62	640798.55	9.25	16.29	Dipole		N	single source
M273	Map 1	954916.49	640806.33	15.68	7.57	Complex Dipole		N	single source
M274	Map 1	955027.26	640801.41	21.72	8.25	Complex Dipole		N	single source
M275	Map 1	955119.88	640801.01	15.42	8.85	Dipole		N	single source
M276	Map 1	955756.08	640813.32	9.45	38.32	Dipole		N	single source
M277	Map 1	956224.78	640833.41	17.72	9.10	Complex Dipole		N	single source
M278	Map 1	956445.88	640824.38	36.00	80.86	Complex Dipole		N	unknown
M279	Map 1	956514.41	640819.89	20.00	124.46	Dipole		N	single source
M280	Map 1	956553.79	640819.46	40.00	135.26	Complex Dipole		N	unknown
M281	Map 1	956629.90	640824.38	25.46	6.03	Complex Dipole		N	single source
M282	Map 1	954391.81	641095.14	28.00	57.03	Complex Dipole		N	single source

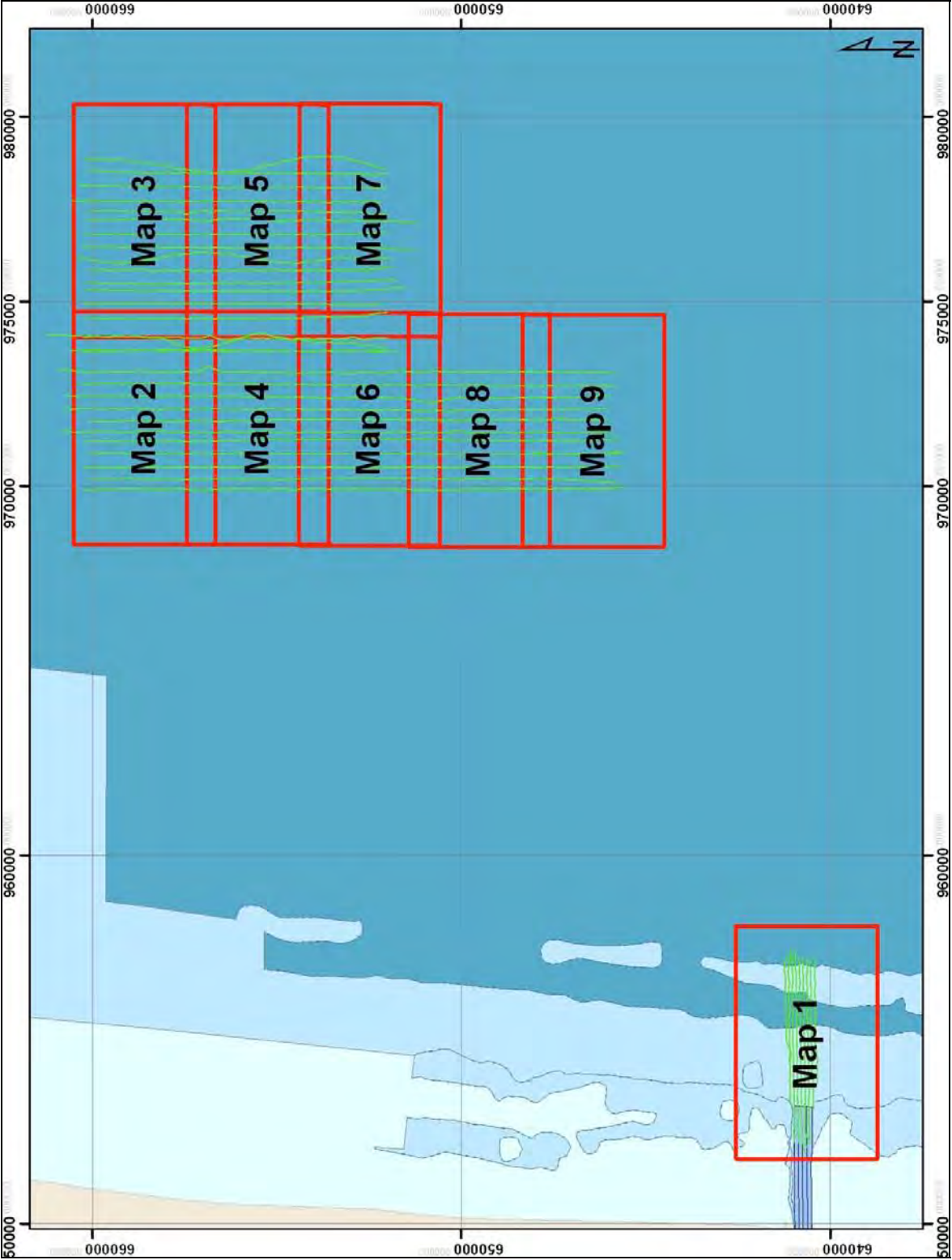


Figure 4-01. Map Key for magnetic contour maps.

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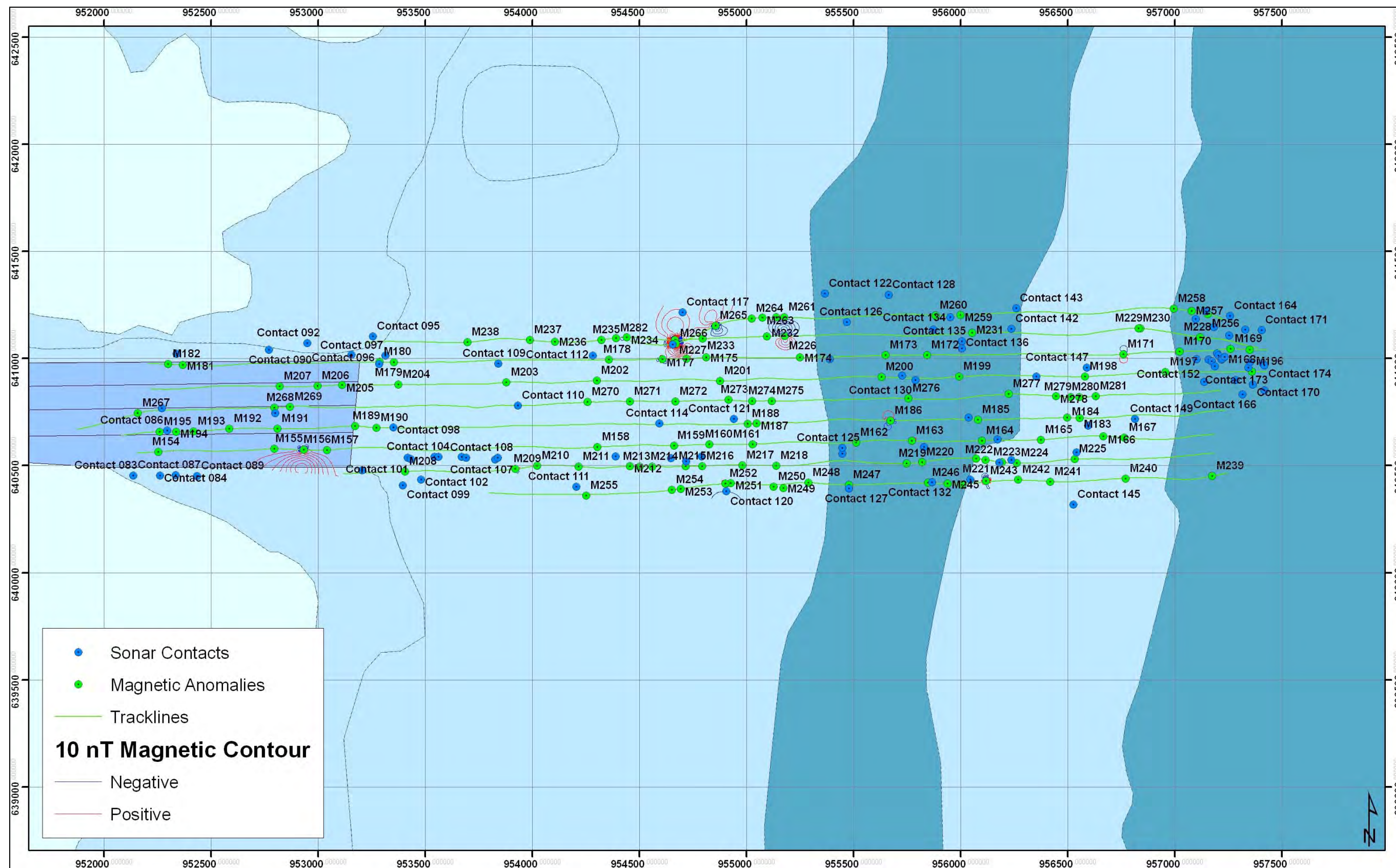


Figure 4-02. Magnetic Contour Map 1.

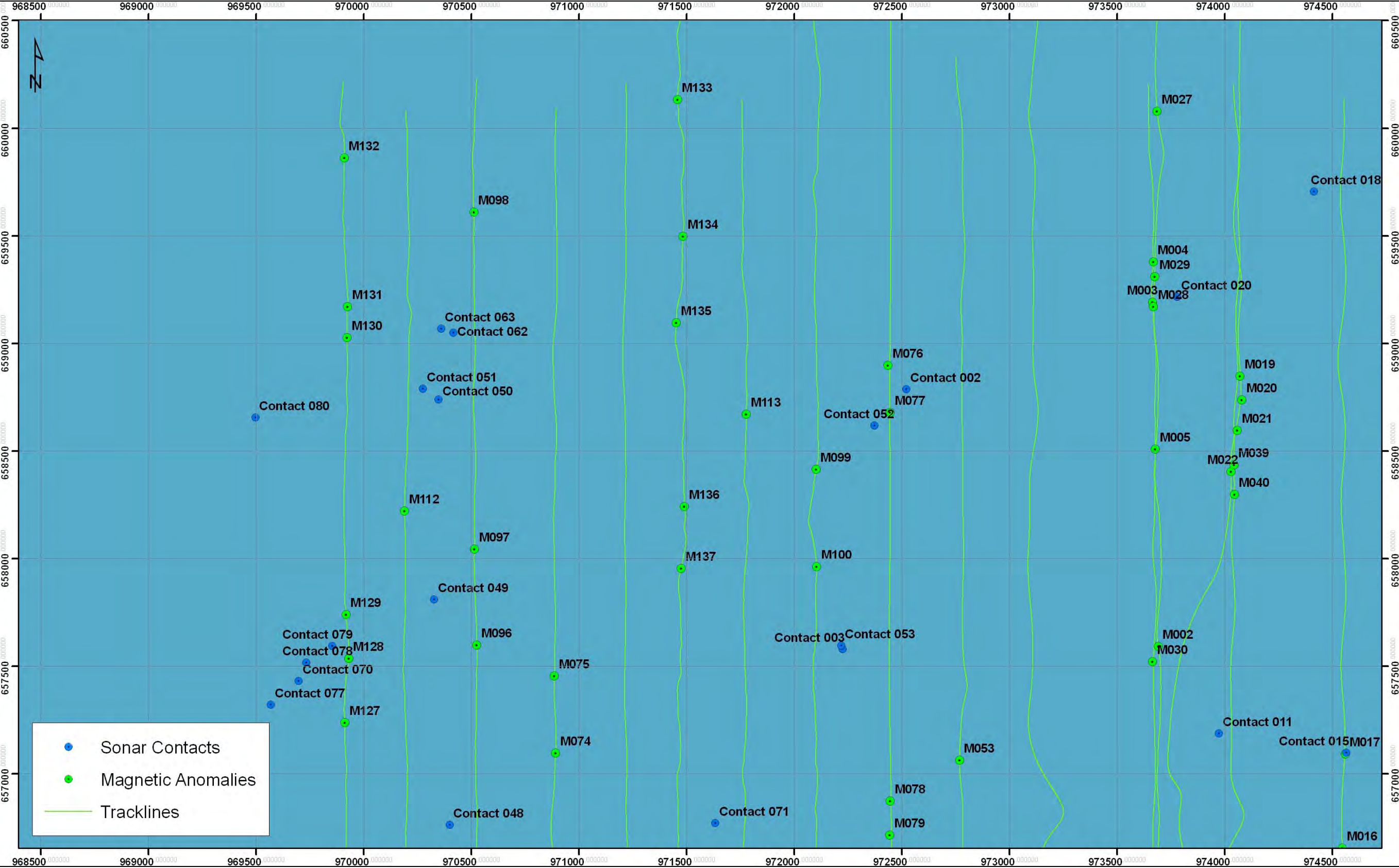


Figure 4-03. Magnetic Contour Map 2.

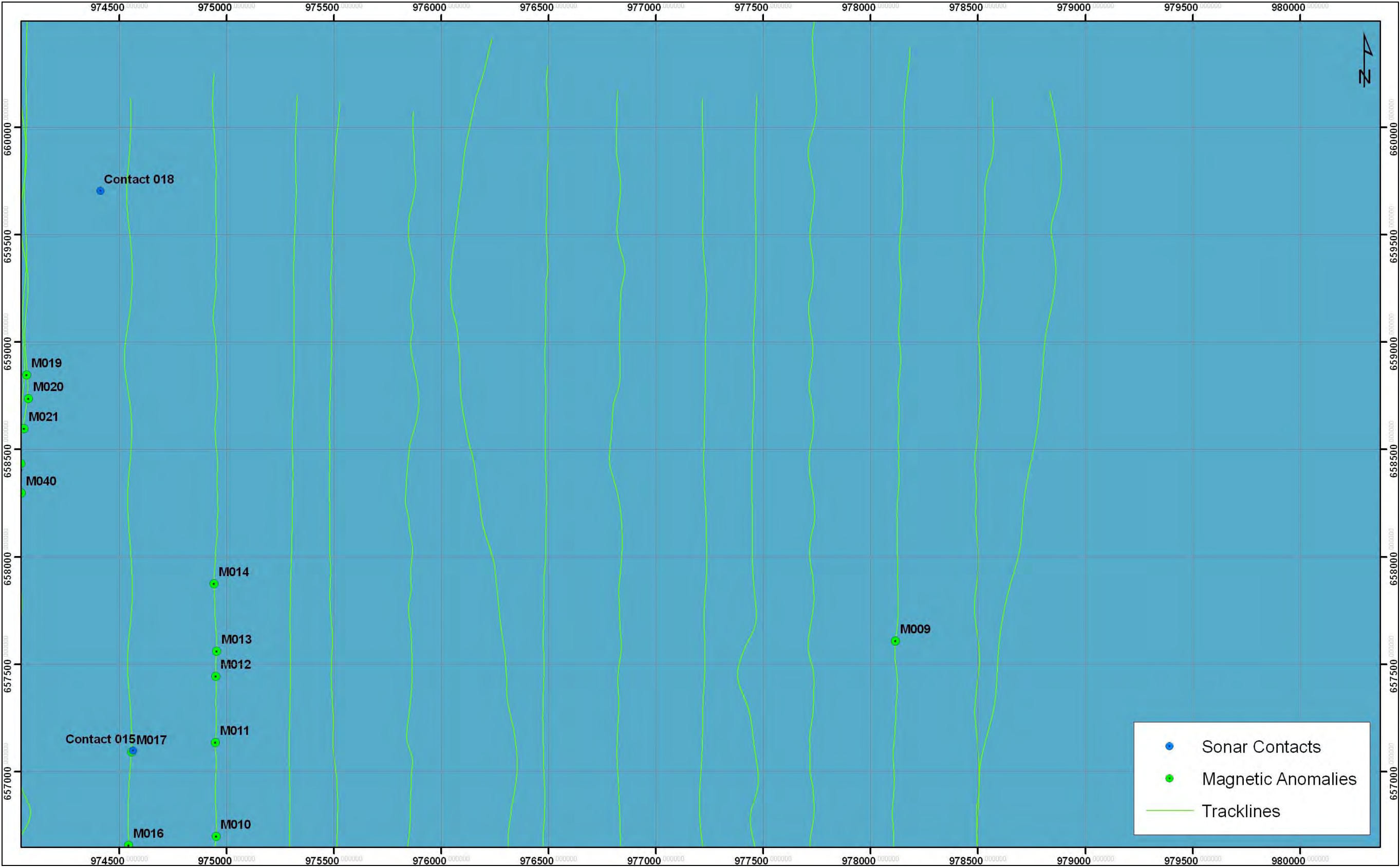


Figure 4-04. Magnetic Contour Map 3.

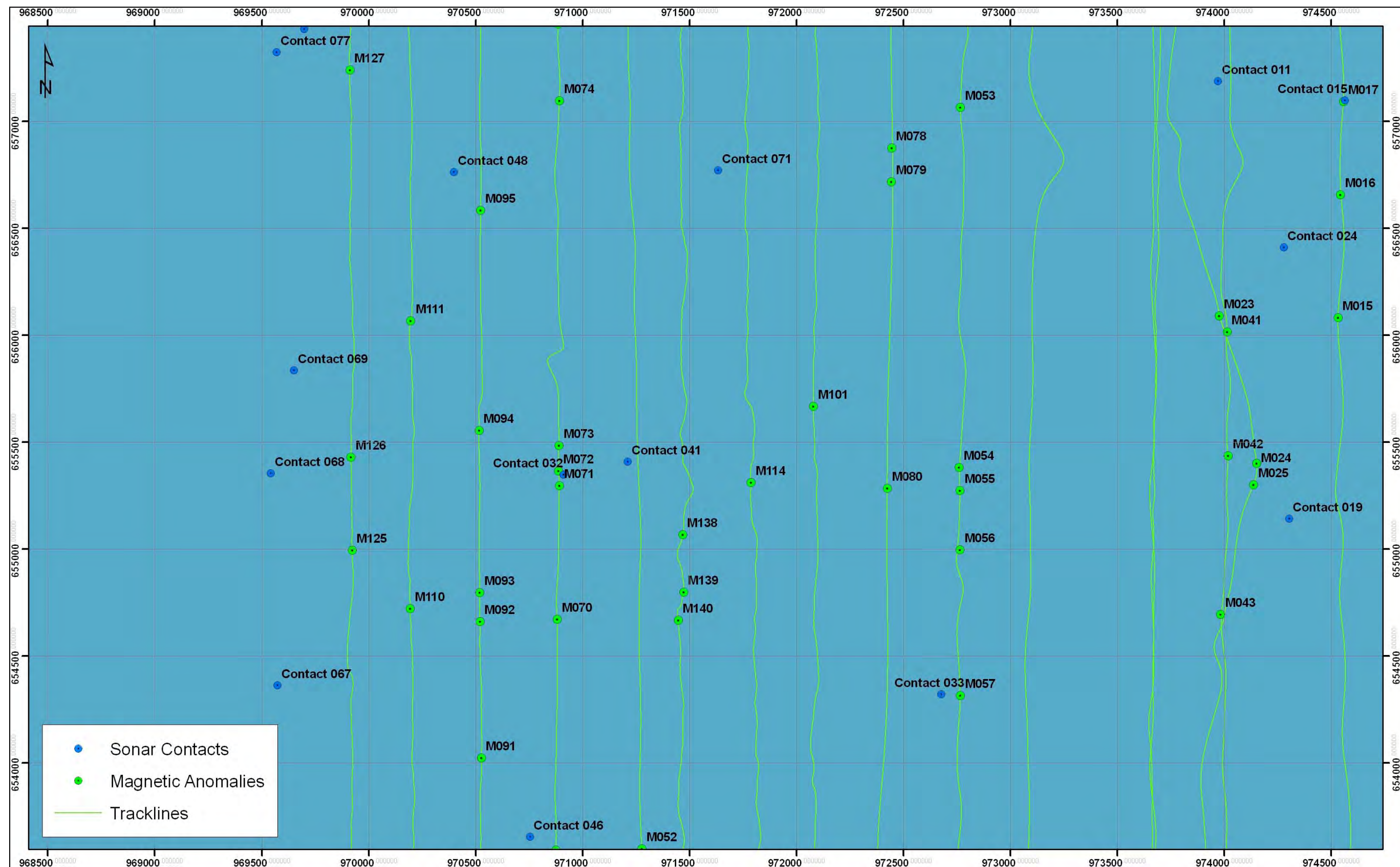


Figure 4-05. Magnetic Contour Map 4.

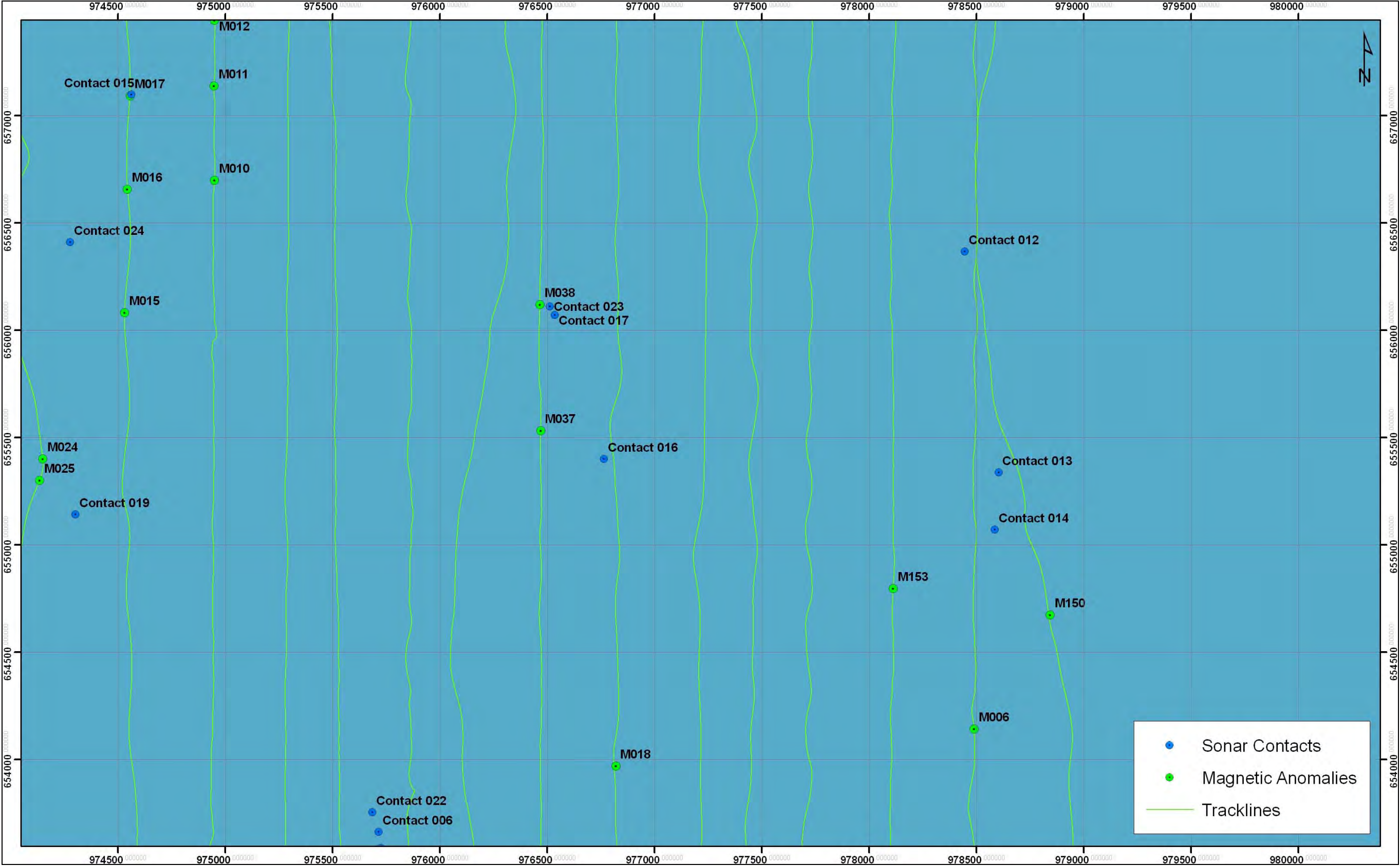


Figure 4-06. Magnetic Contour Map 5.

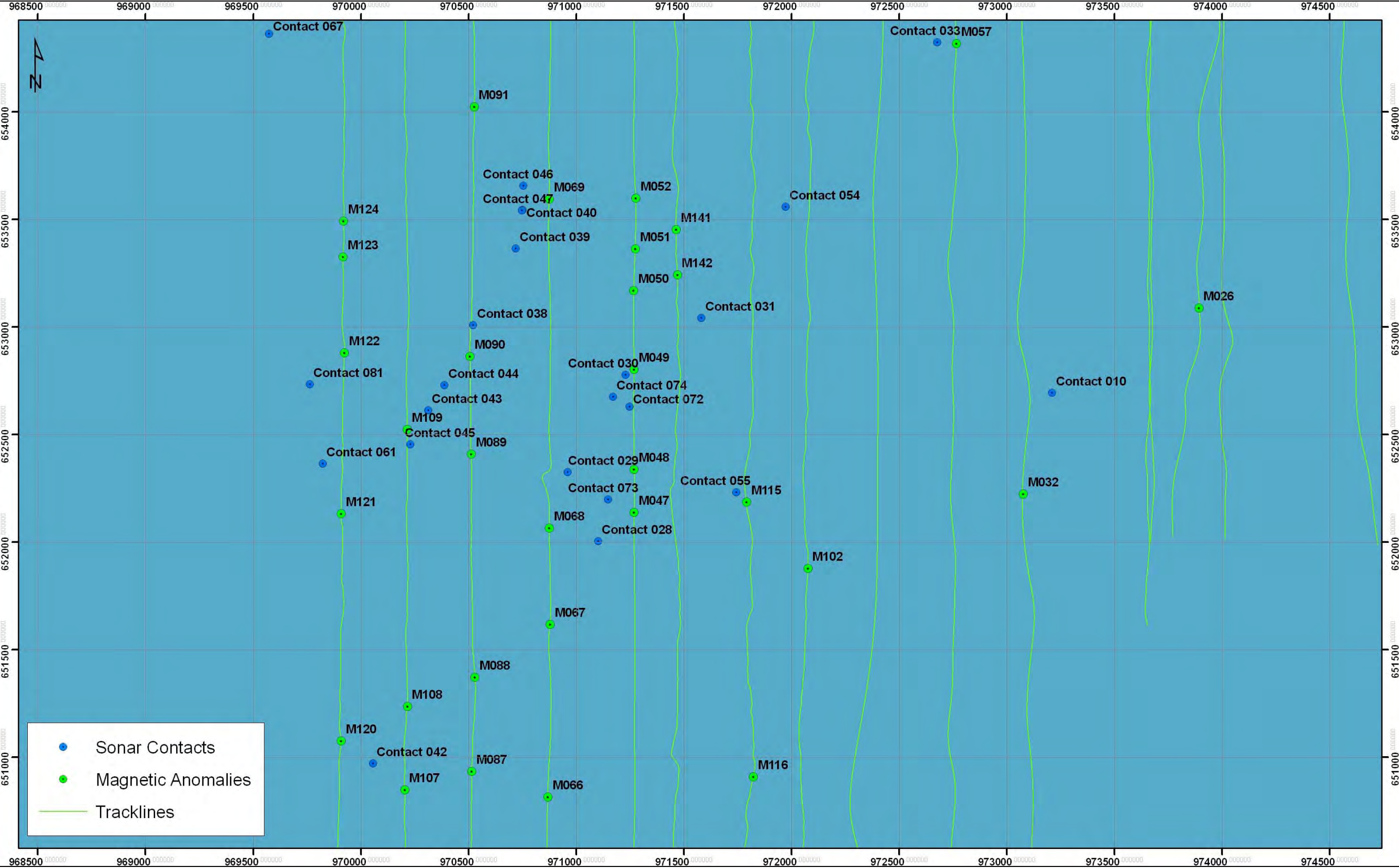


Figure 4-07. Magnetic Contour Map 6.

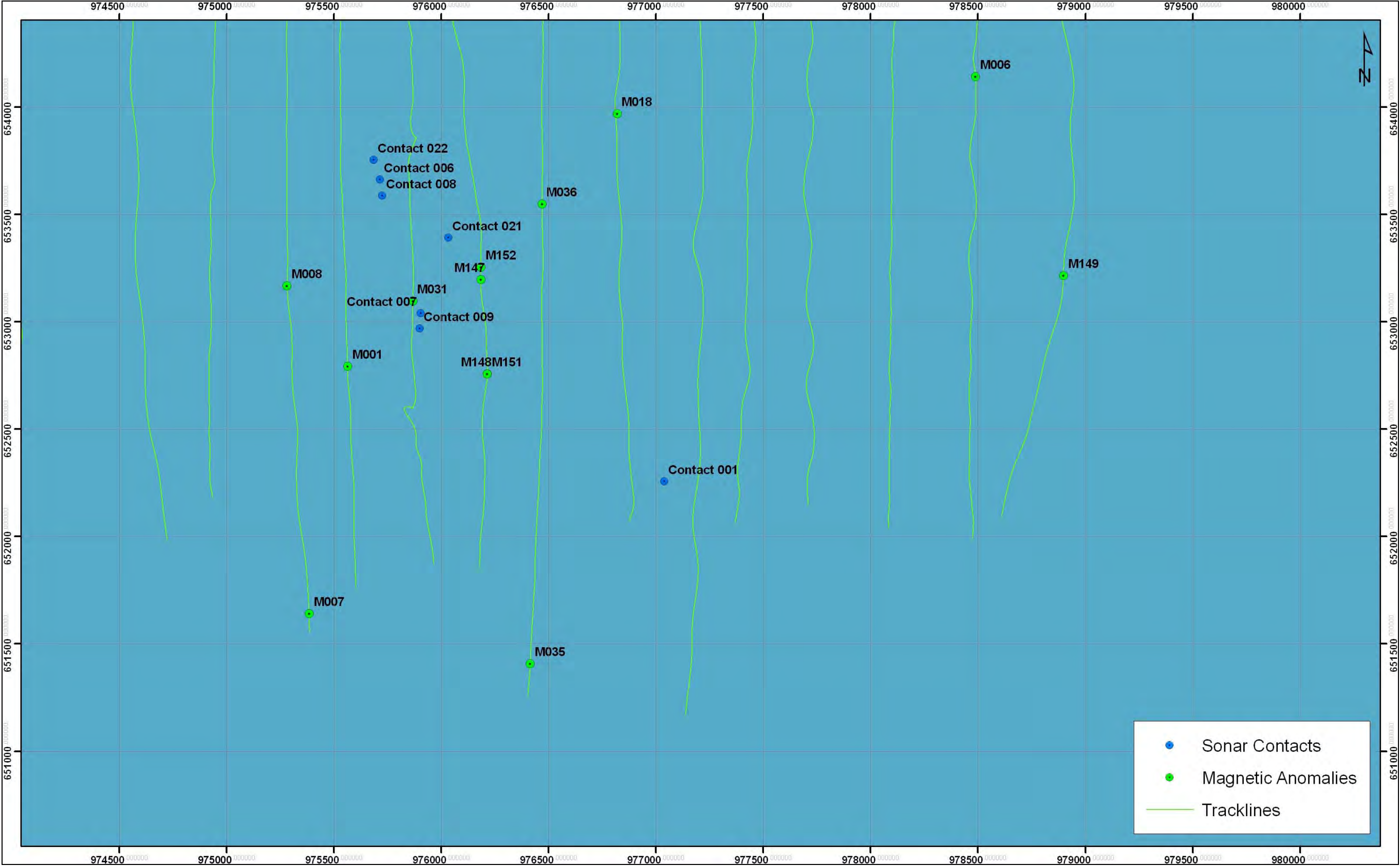


Figure 4-08. Magnetic Contour Map 7.

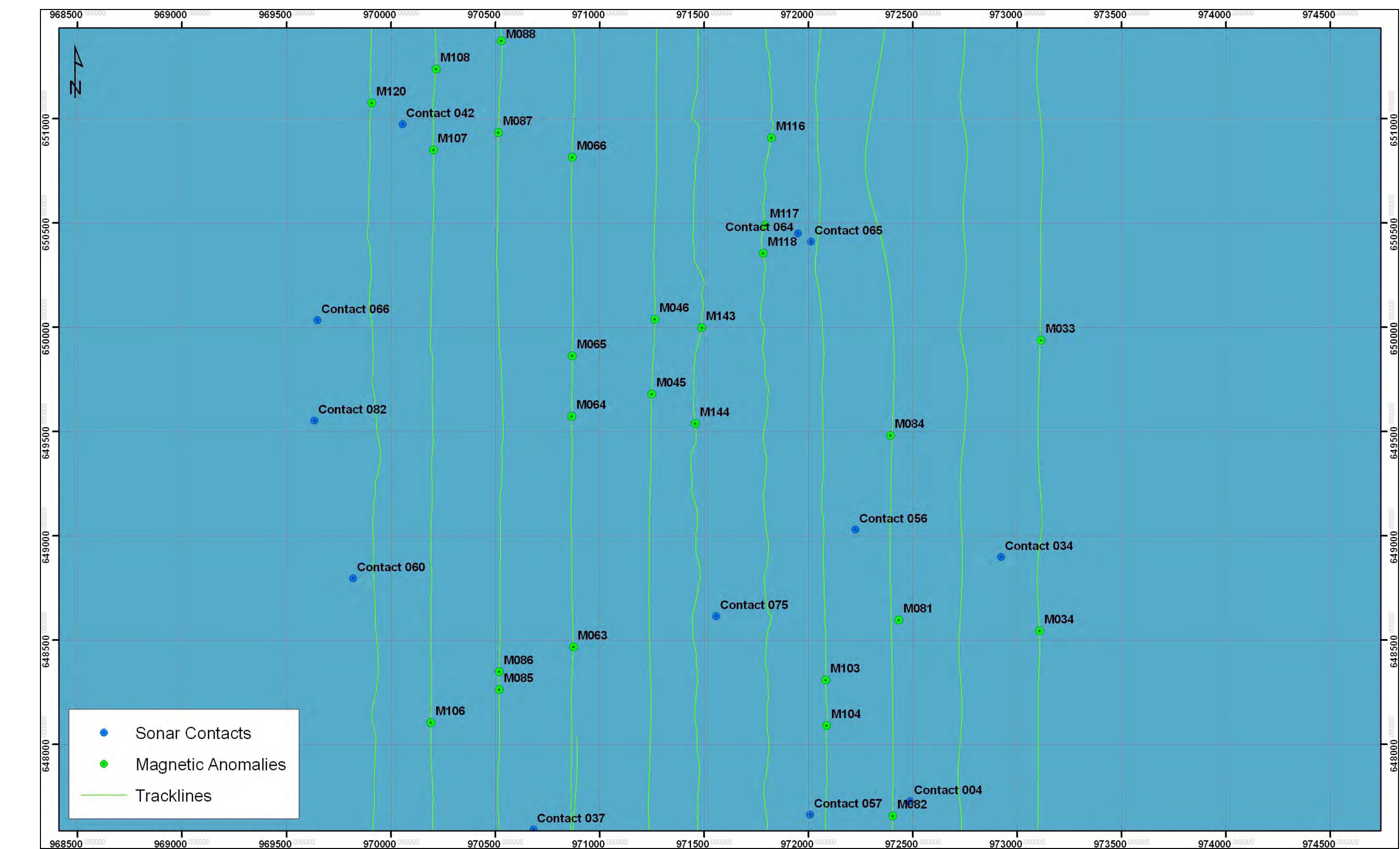


Figure 4-09. Magnetic Contour Map 8.

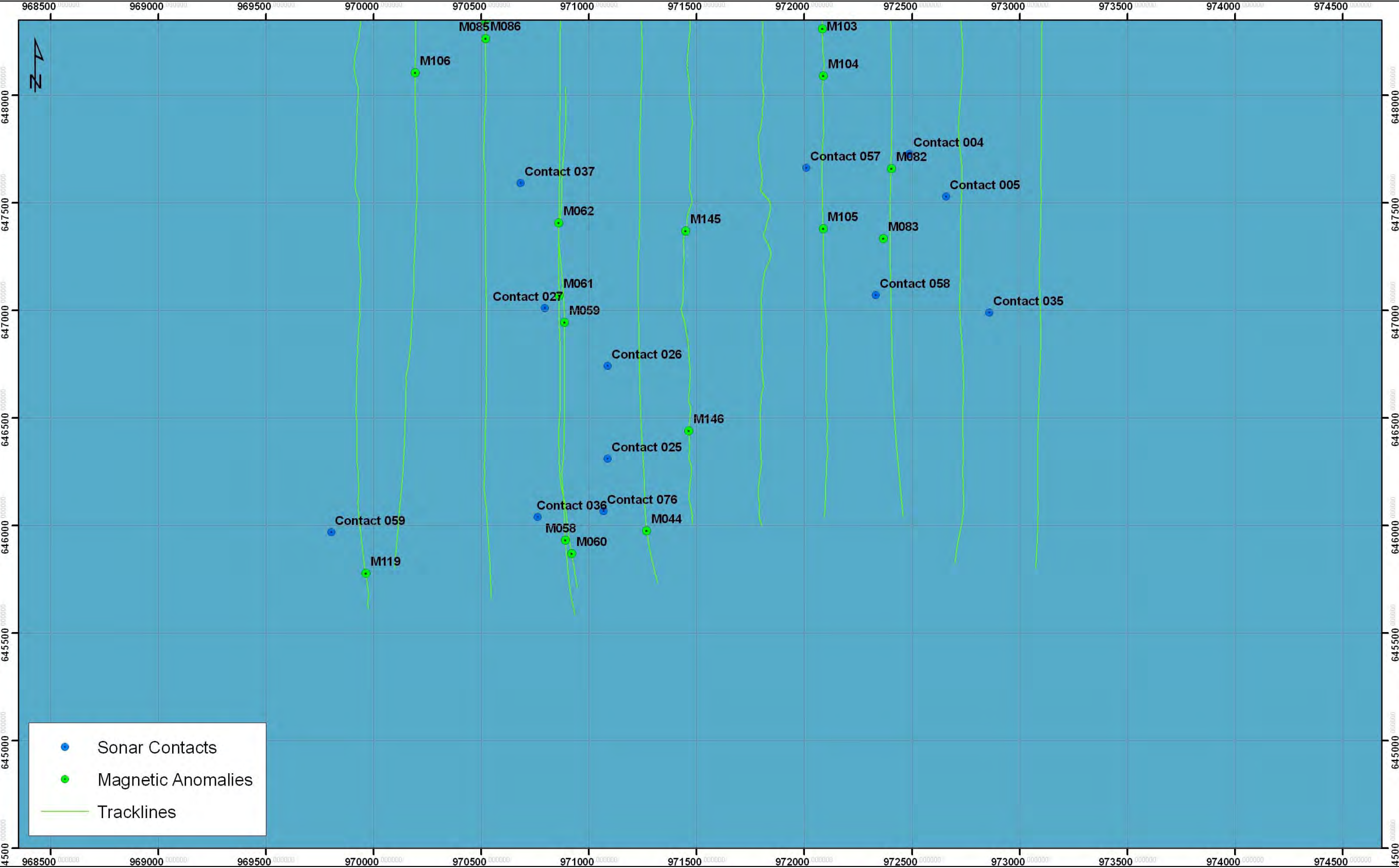


Figure 4-10. Magnetic Contour Map 9.

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Extensive review and analysis of all anomalies indicates that the majority is not considered representative of potentially significant submerged cultural resources. Two hundred forty-five single-source anomalies were recorded and all are thought to represent miscellaneous items associated with the current use patterns of the area, which include a heavily traveled navigation channel and a disposal area. As described previously, examination of both the contour map and the strip-chart for these anomalies indicate that each target was small either in strength, duration, or both, and recorded only on a single transect. Some of the single source anomaly readings are large deviations, yet have a very short duration, which indicates the source for these targets must be small, discrete objects. The single source anomaly type is not considered representative of a potentially significant submerged cultural resource.

A total of six anomalies represent readily identifiable sources, one of which is potentially eligible for NRHP status. Three represent navigation aids or markers, two represent sunken modern vessels (as confirmed with associated sidescan data—or in the case of M118, the association with an AWOIS entry marked as a modern vessel), and one represents a sunken breakwater located on the southern edge of the channel area (as confirmed by an AWOIS entry). The breakwater is eligible for NRHP status (Tubby and Watts 2006) and is listed in the FMSM with site number 8BD4255.

Out of the 282 anomalies, only the unknowns or those described as debris can be given consideration as potentially significant, as the single source anomalies have been ruled out as not meeting criteria, and the rest have been identified. A total of 26 anomalies are classified as unknowns, but only three have signatures that are characteristic of potentially significant resources and these are associated as one cluster (M226, M261, M262). Five are classified as debris (by nature of their associated sonar images); four of the five (M176, M177, M227, M266) are associated as a cluster (and include a sonar contact, C116) and one (M038) is associated with sonar contact C023 as a cluster.

The majority of the unknowns, a total of 23, did not meet established criteria, and are subsequently not considered significant.

M156

Anomaly M156 (Figure 4-02) appears to be related to a submerged breakwater located south of the Project Area, the breakwater listed in the FMSF as 8BD4255. From the appearance of the anomaly, the source lies outside the Project Area. Although the breakwater was determined potentially NRHP eligible (Tubby and Watts 2006b), it is unlikely to be affected by the current construction project and no further work is recommended.

M176, M177, M227, M266, AND C116

Anomalies M176, M177, M227, and M266 (Figure 4-02, Figure 4-11), appear to be a debris field. The largest anomaly in the cluster, M227, is an 1,139 nT dipole with a 110-foot duration (Figure 4-02). Illustrated in Figure 4-12, the corresponding acoustic image (C116) illustrates several large objects occupying an area measuring 50-x-30 feet. Located on the northern edge of the channel (Figure 4-02), this target meets established criteria as a debris field. It is considered potentially significant.

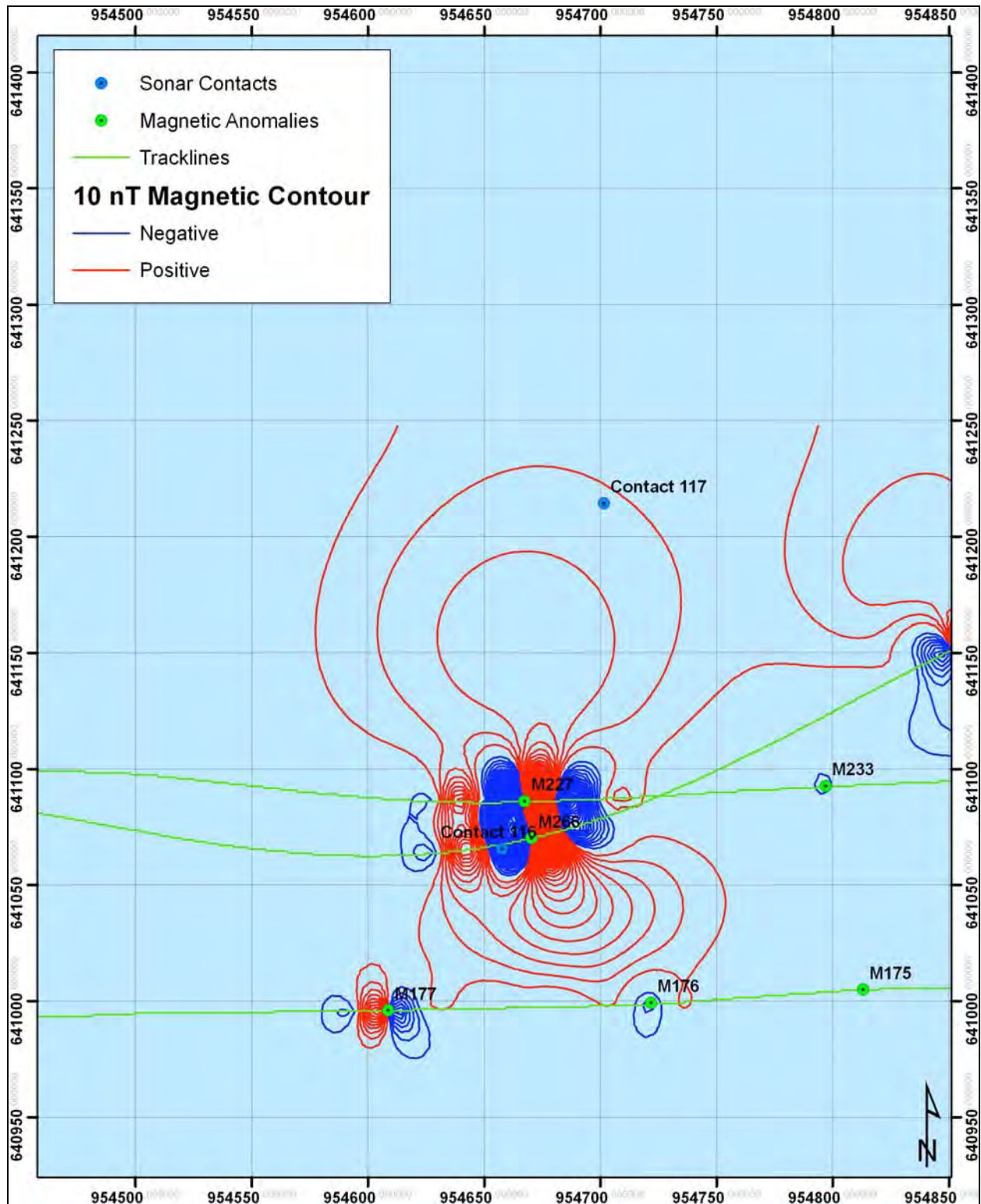


Figure 4-11. Magnetic contour map showing anomalies M176, M177, M227 and M266, located on the north central edge of the channel survey area.

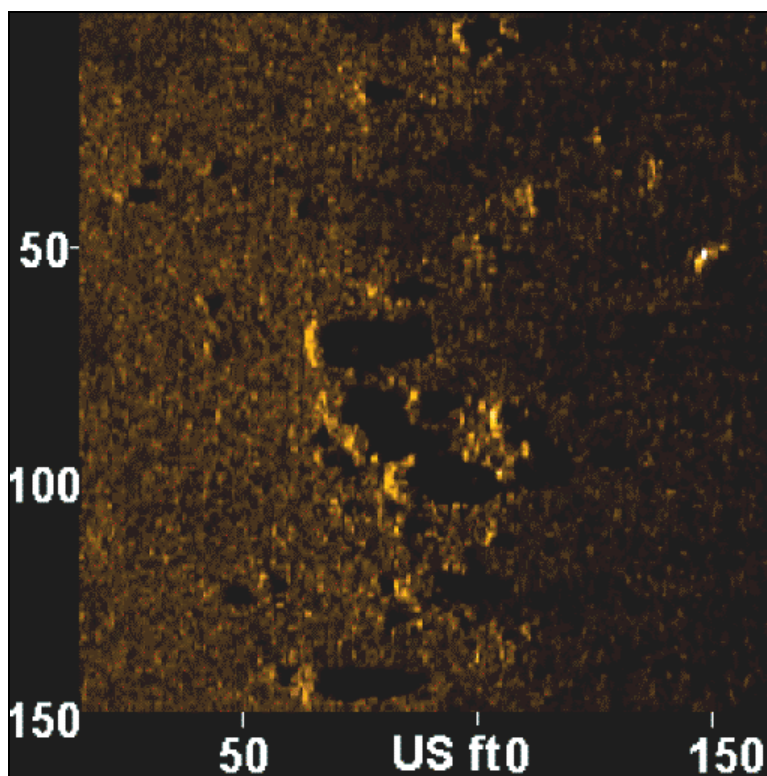


Figure 4-12. Acoustic image of Contact 116 (C116) associated with Anomalies M176, M177, M227, and M266.

M226, M261, AND M262

The three unknowns that are associated as a cluster are all located on the northern edge of the channel survey area (Figure 4-02). Including M226, M261 and M262, and illustrated in Figure 4-13, they were recorded over two survey lines. M226 has the largest deviation at 270 nT and a duration of 85 feet, and also displays a magnetic moment with negative to the north, an indicator of a likely shipwreck site. Because the group of anomalies meets all applicable criteria, they all must be considered as potentially significant.

M038

Classified as debris, M038 is only a 5 nT complex dipole anomaly with a duration of 45 feet (Figure 4-06). While not technically meeting the established criteria, the broad survey interval (100 meters) used in the ODMDS due to the extreme depth of the area (in excess of 600 feet) causes us to allow the magnetic data less weight in determining a potential historic site. Examination of the associated sonar contact (Figure 4-14) indicated the presence of a 40-x-10 foot solid object with a hull-like appearance. This target is considered potentially significant.

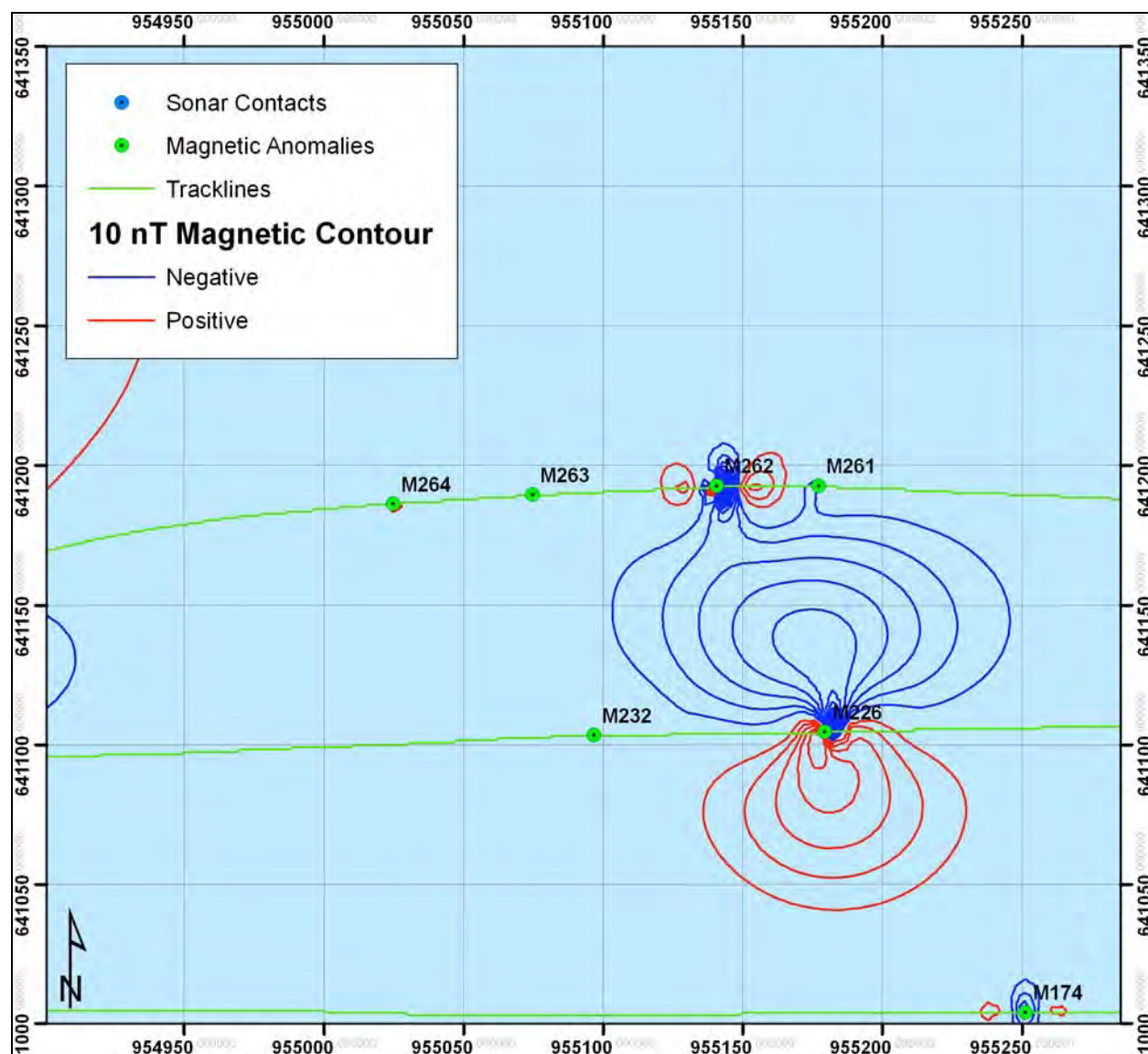


Figure 4-13. Excerpt of the Magnetic Contour Map 1 showing anomalies M-261 and M-262 located on the north central edge of the channel survey area.

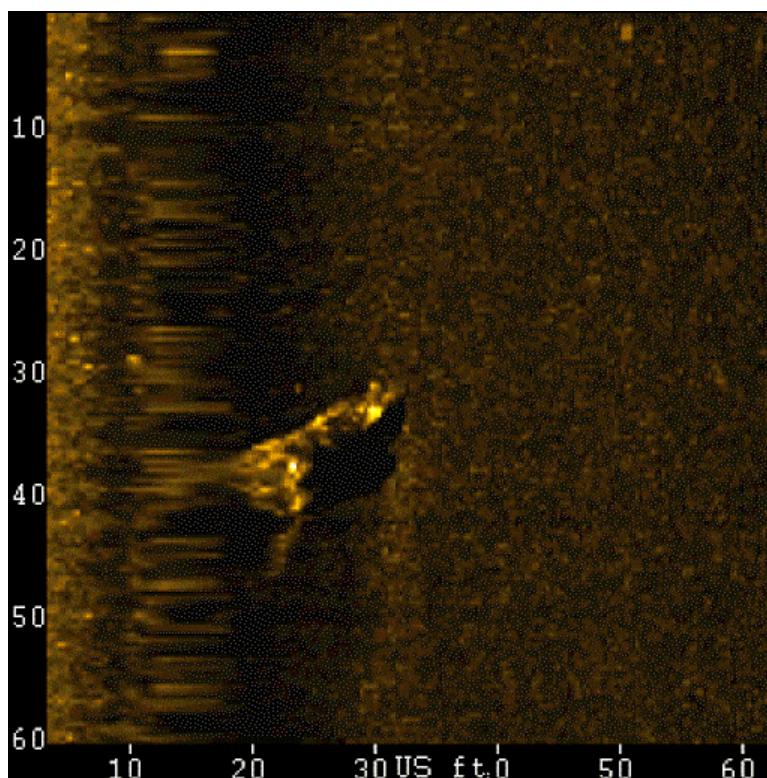


Figure 4-14. Acoustic image of Contact 023 (C023) associated with Anomaly M038.

SIDESCAN SONAR RESULTS

As listed in Tables 4-03 and 4-04, a total of 174 sidescan sonar targets were identified during the analysis of the sidescan sonar data of both the ODMDS and channel survey areas. Figures 4-16 and 4-17 present two sidescan mosaics of the Project Area, one of the channel and the other showing the entire coverage of the ODMDS. Contact locations can be found on the magnetic contour maps above (Figures 4-02–4-10) with specific maps for each target listed in the table. These 174 targets, which included objects or anomalous bottom returns that were not uniform sand bottom or a sand wave feature, consist of: 96 classified as debris; 52 classified as a debris field; 21 as seafloor features; two as modern sunken vessels; and three unknown. Acoustic images of all the sidescan targets are presented in Tables 4-05 and 4-06. Lists of the acoustic targets, categorized by group, are as follows:

Seafloor Features: C001, C015, C024, C027, C049, C052, C067–C069, C076, C080, C111, C148, C151, C152, C156, C165, C168, C169, C172, C174

Debris: C002–C012, C017–C023, C025–C027, C032, C033, C036, C037, C039–C048, C050, C051, C053–C055, C057, C059–C066, C070–C075, C077–C079, C081, C082, C083, C088, C093, C095–C098, C100, C102, C104–C107, C109, C110, C112, C114, C117–C120, C123, C126, C131, C132, C144, C147, C150, C153, C155, C157–C162, C166, C170, C173

Debris Field: C013, C014, C016, C025–C027, C031, C034, C035, C038, C056, C058, C084–C087, C089, C090, C091, C094, C099, C101, C103, C108, C113, C115, C116, C122, C124, C125, C127–C130, C133–C143, C145, C146, C149, C163, C164, C167, C171

Unknown: C092, C121, C154

Modern Small Boats: C007, C033

After an extensive review and analysis of the contacts, it is felt that only three of the sonar contacts are to be considered potentially historic. C023 and C116 are discussed above with their associated magnetic anomalies. C070 (Map 2, Figures 4-03 and 4-15) is an elongated solid object 67 feet in length and 21 feet wide. Although not associated with a magnetic anomaly, its physical characteristics—including dimensions and relief—suggest it may represent a vessel, and so is considered potentially historic in nature. Two other vessels (C007 and C033) are present in the ODMDS that are thought to be, based on their size (approximately 20 feet in each case), modern small boats (Map 7, Figure 4-08 and Map 4, Figure 4-05), and are not considered potentially significant. The rest represent miscellaneous bits of debris, debris fields not associated with a magnetic signature and not exhibiting any outward physical characteristics suggestive of significant historic resources, or seafloor features considered geologic in nature.

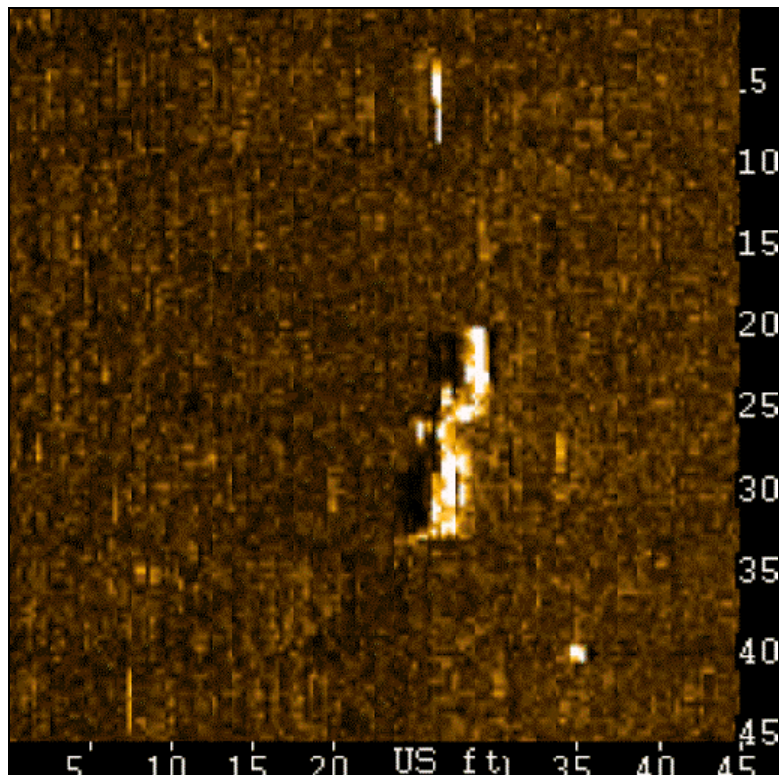


Figure 4-15. Acoustic image of Contact 070.

Table 4-03. ODMDS Sidescan Sonar Targets.

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C001	7	977039	652258	23.14	18.82	0.00	Apparent large depression with possible piece of debris inside	Seafloor Feature	
C002	2	972520	658787	22.00	22.56	7.75	Miscellaneous piece of debris.	Debris	
C003	2	972224	657579	30.22	33.74	0.72	Miscellaneous piece of debris.	Debris	
C004	8	972488	647727	6.22	6.39	2.27	Miscellaneous piece of debris.	Debris	M082
C005	9	972659	647529	8.25	7.08	1.95	Miscellaneous piece of debris.	Debris	
C006	5	975715	653662	25.02	3.66	1.43	Miscellaneous piece of linear debris and miscellaneous small piece	Debris	
C007	7	975905	653040	35.54	8.62	1.40	overturned boat hull	Modern boat	
C008	7	975725	653589	65.95	8.50	1.39	Miscellaneous piece of debris.	Debris	
C009	7	975900	652969	34.52	7.62	0.76	Miscellaneous piece of linear debris.	Debris	
C010	6	973211	652693	45.24	26.21	0.00	Miscellaneous piece of debris.	Debris	
C011	2	973971	657187	226.76	4.81	0.85	Miscellaneous linear piece of debris.	Debris	
C012	5	978445	656366	26.34	9.59	4.01	Miscellaneous piece of debris.	Debris	
C013	5	978602	655336	194.42	148.91	0.00	Scattered pieces of small low relief debris.	Debris Field	
C014	5	978584	655071	329.08	356.60	0.00	Scattered pieces of low relief debris.	Debris Field	
C015	2	974564	657097	29.65	19.58	0.00	Apparent depression.	Seafloor Feature	
C016	5	976765	655399	87.40	37.26	0.00	Scattered miscellaneous pieces of small low relief debris.	Debris Field	
C017	5	976536	656070	53.05	21.05	6.90	Miscellaneous piece of debris	Debris	
C018	2	974412	659705	46.41	22.92	0.20	Miscellaneous piece of debris.	Debris	
C019	5	974303	655142	28.21	6.94	0.88	Miscellaneous piece of debris.	Debris	
C020	2	973778	659217	23.33	12.89	0.00	Miscellaneous piece of debris.	Debris	M003, M028
C021	7	976033	653393	19.12	21.54	1.08	Miscellaneous piece of debris.	Debris	
C022	5	975686	653753	28.01	9.93	0.84	Miscellaneous piece of debris.	Debris	
C023	5	976512	656109	40.07	8.04	9.24	Miscellaneous piece of debris.	Debris	M038

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C024	5	974278	656410	273.71	59.39	0.00	Area of high reflectivity.	Seafloor Feature	
C025	9	971088	646310	100.09	165.03	0.00	Scattered miscellaneous pieces of small low relief debris	Debris Field	
C026	9	971087	646743	30.00	25.00	0.00	Scattered miscellaneous pieces of low relief debris.	Debris Field	
C027	9	970795	647011	109.65	63.34	0.00	Scattered miscellaneous pieces of small low relief debris.	Debris Field	M059, M061
C028	6	971102	652004	27.88	8.66	0.00	Apparent depression.	Seafloor Feature	
C029	6	970962	652325	13.15	13.26	0.00	Miscellaneous piece of debris.	Debris	
C030	6	971229	652776	7.99	24.75	0.00	Miscellaneous piece of debris with near by scarring.	Debris	M049
C031	6	971581	653041	262.05	217.47	0.00	Scattered miscellaneous pieces of medium to large low relief debris	Debris Field	
C032	4	970911	655348	64.12	15.33	0.66	Miscellaneous piece of debris.	Debris	M071, M072
C033	4	972677	654322	23.27	16.40	0.00	Small boat	Modern boat	M057
C034	8	972923	648898	113.11	353.50	0.00	Scattered miscellaneous pieces of small low relief debris.	Debris Field	
C035	9	972860	646990	85.56	109.16	0.00	Scattered miscellaneous pieces of small low relief objects.	Debris Field	
C036	9	970761	646040	14.59	15.03	0.00	Miscellaneous piece of debris.	Debris	
C037	9	970684	647593	8.92	4.96	1.06	Miscellaneous piece of debris.	Debris	
C038	6	970522	653007	235.33	99.43	0.00	Scattered miscellaneous pieces of small to large low relief debris	Debris Field	M090
C039	6	970719	653364	23.96	12.34	4.02	Miscellaneous piece of debris.	Debris	
C040	6	970751	653543	3.99	8.56	3.21	Miscellaneous piece of debris	Debris	M069
C041	4	971211	655408	19.57	14.27	0.00	Miscellaneous piece of debris.	Debris	
C042	6	970057	650971	54.77	20.50	0.85	Miscellaneous piece of debris.	Debris	M120
C043	6	970313	652613	15.29	13.03	0.00	Miscellaneous piece of debris.	Debris	
C044	6	970389	652729	13.70	8.00	0.00	Miscellaneous piece of debris.	Debris	

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C045	6	970230	652453	8.95	9.57	0.00	Miscellaneous piece of debris.	Debris	M109
C046	4	970754	653655	15.29	5.00	1.06	Miscellaneous piece of debris.	Debris	
C047	6	970749	653541	12.29	12.47	1.78	Miscellaneous piece of debris.	Debris	M069
C048	2	970399	656761	22.53	5.00	5.70	Miscellaneous piece of debris.	Debris	
C049	2	970327	657810	369.34	258.79	0.00	Area of high reflectivity.	Seafloor Feature	
C050	2	970348	658739	16.20	8.67	1.39	Miscellaneous piece of debris.	Debris	
C051	2	970275	658789	18.55	8.02	0.00	Two miscellaneous pieces of debris.	Debris	
C052	2	972372	658618	75.80	37.20	0.00	Area of high reflectivity.	Seafloor Feature	M077
C053	2	972218	657596	16.65	28.89	5.19	Miscellaneous piece of debris.	Debris	
C054	6	971973	653557	13.48	8.90	0.00	Miscellaneous piece of debris.	Debris	
C055	6	971744	652231	28.81	5.19	0.83	Miscellaneous linear piece of debris.	Debris	M115
C056	8	972225	649030	194.45	289.34	0.00	Scattered miscellaneous pieces of small low relief debris.	Debris Field	
C057	8	972010	647663	14.85	36.80	0.00	Miscellaneous piece of debris.	Debris	
C058	9	972333	647072	155.03	432.39	0.00	Scattered miscellaneous pieces of small low relief pieces of debris	Debris Field	
C059	9	969803	645969	18.66	20.17	1.23	Miscellaneous piece of debris.	Debris	
C060	8	969820	648795	112.79	19.11	0.00	Miscellaneous three pieces of debris.	Debris	
C061	6	969823	652365	16.35	14.78	0.00	Miscellaneous piece of debris.	Debris	
C062	2	970417	659048	18.48	13.60	0.64	Miscellaneous piece of debris.	Debris	
C063	2	970360	659067	6.12	7.75	1.36	Miscellaneous piece of debris.	Debris	
C064	8	971950	650450	13.43	9.26	0.79	Miscellaneous piece of debris.	Debris	M117
C065	8	972012	650410	13.33	8.93	0.00	Miscellaneous piece of debris.	Debris	M118
C066	8	969649	650034	15.21	10.00	0.00	Miscellaneous piece of debris.	Debris	
C067	4	969574	654362	515.16	170.73	0.00	Area of high reflectivity.	Seafloor Feature	
C068	4	969543	655355	505.80	133.87	0.00	Area of high reflectivity.	Seafloor Feature	
C069	4	969652	655835	342.26	108.64	0.00	Area of high reflectivity.	Seafloor Feature	
C070	2	969699	657431	67.76	21.07	0.64	Miscellaneous piece of debris.	Debris	

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C071	2	971634	656770	27.07	40.75	1.55	Miscellaneous piece of debris.	Debris	
C072	6	971248	652630	14.17	24.39	0.00	Miscellaneous piece of debris.	Debris	
C073	6	971148	652198	39.83	2.38	0.00	Miscellaneous piece of debris.	Debris	M047
C074	6	971171	652674	8.04	14.25	0.00	Miscellaneous piece of debris.	Debris	
C075	8	971559	648616	15.11	4.68	1.71	Miscellaneous piece of debris.	Debris	
C076	9	971067	646067	31.63	57.49	0.00	Area of high reflectivity.	Seafloor Feature	
C077	2	969570	657321	24.69	14.76	0.00	Miscellaneous piece of debris.	Debris	
C078	2	969734	657516	16.84	8.98	0.00	Miscellaneous piece of debris.	Debris	
C079	2	969855	657594	13.50	7.30	0.00	Miscellaneous piece of debris.	Debris	M128
C080	2	969497	658656	35.26	60.11	0.00	Area of high reflectivity.	Seafloor Feature	
C081	6	969763	652734	49.13	18.93	0.00	Miscellaneous piece of debris.	Debris	
C082	8	969635	649551	22.11	5.42	0.00	Miscellaneous piece of debris.	Debris	

Table 4-04. Channel Sidescan Sonar Targets.

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C083	1	952140	640454	24.01	25.78	0.00	Three pieces of miscellaneous medium relief debris.	Debris	
C085	1	952273	640769	26.74	32.64	0.00	Miscellaneous scattered pieces of low relief debris.	Small Debris Field	
C086	1	952297	640664	90.23	70.88	0.00	Small area of scattered miscellaneous low relief pieces of debris.	Small Debris Field	M194, M195
C087	1	952338	640455	61.06	30.36	0.00	Miscellaneous scattered pieces of medium relief debris.	Small Debris Field	
C088	1	952341	641022	20.61	38.44	0.00	Miscellaneous three pieces of high relief debris, about 4 feet tall each.	Debris	M181, M182
C089	1	952436	640451	54.08	11.85	0.00	Miscellaneous scattered pieces of low to medium relief debris.	Small Debris Field	

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C090	1	952772	641040	33.21	37.28	0.00	Miscellaneous scattered pieces of medium to high relief debris, ranging from 2 to 5 feet in height	Small Debris Field	
C091	1	952802	640744	515.00	300.00	0.00	Large area of miscellaneous scattered debris.	Large Debris Fie	M268
C092	1	952952	641072	200.00	40.00	0.00			
C093	1	953156	641018	7.36	4.52	2.18	Miscellaneous piece of debris.	Debris	
C094	1	953207	640477	50.00	50.00	0.00	Miscellaneous scattered pieces of low relief debris.	Small Debris Field	
C095	1	953257	641104	20.96	11.84	0.00	Miscellaneous two pieces of high relief debris, ranging from 4 to 6 feet in height.	Debris	
C096	1	953287	640973	6.47	5.36	0.23	Miscellaneous piece of debris, possibly a tire.	Debris	M180
C097	1	953315	641014	7.35	4.90	0.41	Miscellaneous piece of debris.	Debris	
C098	1	953352	640679	27.09	28.01	0.00	Miscellaneous two pieces of medium relief debris, about 1 foot in height.	Debris	
C099	1	953397	640407	60.07	43.60	0.00	Miscellaneous scattered pieces of low relief debris, all 1.5 feet or less in height.	Small Debris Field	
C100	1	953420	640537	11.94	5.98	2.57	Miscellaneous piece of debris.	Debris	
C101	1	953435	640530	54.23	15.32	0.00	Miscellaneous scattered pieces of medium relief debris, ranging from 1 to 3 feet in height.	Small Debris Field	
C102	1	953482	640435	4.94	2.96	2.31	Miscellaneous piece of debris.	Debris	
C103	1	953544	640540	77.31	22.53	0.00	Miscellaneous scattered pieces of low to medium relief debris	Small Debris Field	
C104	1	953564	640540	10.97	6.95	3.39	Miscellaneous piece of debris.	Debris	
C105	1	953671	640541	8.47	4.01	2.06	Miscellaneous piece of debris.	Debris	
C106	1	953692	640536	10.85	6.52	2.29	Miscellaneous piece of debris.	Debris	
C107	1	953827	640528	16.60	19.43	0.00	Miscellaneous three pieces of medium relief debris, all about 1 foot in height.	Debris	

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C108	1	953841	640535	48.62	14.45	0.00	Miscellaneous scattered pieces of medium relief debris, 1 to 2 feet in height.	Small Debris Field	
C109	1	953843	640976	4.67	4.89	1.06	Miscellaneous piece of debris, possibly a tire.	Debris	
C110	1	953934	640780	7.42	3.05	2.26	Miscellaneous piece of debris.	Debris	
C111	1	954207	640402	150.00	150.00	0.00		Seafloor Feature	
C112	1	954283	641012	6.11	3.85	1.47	Miscellaneous piece of debris.	Debris	
C113	1	954390	640542	50.00	20.00	0.00	Miscellaneous scattered pieces of low relief debris.	Small Debris Field	
C114	1	954594	640697	13.19	8.82	0.26	Miscellaneous piece of debris.	Debris	
C115	1	954648	640534	34.16	27.34	0.00	Miscellaneous scattered pieces of low to medium relief debris, less than 1 foot in height.	Small Debris Field	
C116	1	954658	641066	61.87	32.54	0.00	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2	Small Debris Field	M176, M177, M227, M266
C117	1	954702	641214	23.83	3.29	0.19	Miscellaneous two pieces of linear debris	Debris	
C118	1	954718	640519	79.37	10.24	4.14	Miscellaneous piece of debris.	Debris	M215, AWOIS 8482
C119	1	954791	640543	7.21	17.43	0.00	Miscellaneous three pieces of medium relief debris, ranging from 2 to 3 feet in height.	Debris	
C120	1	954907	640379	5.51	3.45	0.72	Miscellaneous piece of debris.	Debris	M251, M252
C121	1	954943	640718	650.00	4.00	0.00			
C122	1	955368	641302	45.20	32.05	0.00	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than 1 foot to 2	Small Debris Field	
C123	1	955389	640996	4.19	2.81	1.41	Miscellaneous piece of debris.	Debris	
C124	1	955448	640555	60.87	70.09	0.00	Miscellaneous scattered pieces of low relief debris, less than one foot in height.	Small Debris Field	

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C125	1	955448	640583	101.91	44.41	0.00	Miscellaneous scattered pieces of low relief debris, less than one foot in height.	Small Debris Field	
C126	1	955469	641169	6.77	3.51	1.58	Miscellaneous piece of debris.	Debris	
C127	1	955480	640392	60.42	51.56	0.00	Miscellaneous scattered pieces of low relief debris, less than one foot in height.	Small Debris Field	
C128	1	955664	641297	27.92	65.53	0.00	Miscellaneous scattered pieces of low to high relief debris, ranging from less than a foot to three	Small Debris Field	
C129	1	955728	640919	100.00	60.00	0.00	Miscellaneous scattered pieces of low relief debris, less than one foot in height.	Small Debris Field	
C130	1	955790	640899	51.47	53.14	0.00	Miscellaneous scattered pieces of low relief debris, less than one foot in height.	Small Debris Field	
C131	1	955829	640586	3.70	1.39	1.26	Miscellaneous piece of debris.	Debris	
C132	1	955866	640421	4.43	1.85	1.36	Miscellaneous piece of debris.	Debris	M246
C133	1	955872	641134	46.47	41.66	0.00	Miscellaneous scattered pieces of low relief debris, a foot or less in height.	Small Debris Field	M259, M260, C134
C134	1	955952	641192	150.00	150.00	2.07	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 3	Small Debris Field	M259, M260, C133
C135	1	956005	641081	40.47	107.05	0.00	Miscellaneous scattered pieces of low relief debris, less than a foot in height.	Small Debris Field	M231
C136	1	956007	641047	150.00	150.00	2.08	Miscellaneous scattered pieces of low to medium relief debris, ranging from 1 to 2 feet in height.	Small Debris Field	
C137	1	956038	640723	54.36	47.69	0.00	Miscellaneous scattered pieces of low relief debris, less than one foot in height.	Small Debris Field	

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C138	1	956046	640433	113.76	62.63	0.00	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2	Small Debris Field	
C139	1	956172	640622	71.77	108.14	0.00	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2	Small Debris Field	
C140	1	956182	640513	79.28	53.60	0.00	Miscellaneous scattered pieces of low to medium debris, ranging from less than a foot to 2 feet hi	Small Debris Field	M223
C141	1	956238	640526	19.63	83.34	0.00	Miscellaneous scattered pieces of low relief debris, less than a foot in height.	Small Debris Field	M224
C142	1	956238	641138	31.34	28.48	0.00	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2	Small Debris Field	
C143	1	956259	641234	26.69	26.70	0.00	Miscellaneous scattered pieces of medium relief debris, 1 to 2 feet in height.	Small Debris Field	
C144	1	956353	640915	18.42	19.05	1.57	Miscellaneous piece of debris.	Debris	
C145	1	956527	640318	1000.00	330.00	0.00	Miscellaneous scattered pieces of debris. 1000 feet by 330.	Large Debris Field	
C146	1	956541	640561	13.19	38.49	0.00	Miscellaneous scattered pieces of medium relief debris, 1 to 2 feet in height.	Small Debris Field	M225
C147	1	956590	640956	10.35	17.72	0.00	Miscellaneous two pieces of debris, 3 feet high.	Debris	M198
C136	1	956007	641047	150.00	150.00	2.08	Miscellaneous scattered pieces of low to medium relief debris, ranging from 1 to 2 feet in height.	Small Debris Field	
C137	1	956038	640723	54.36	47.69	0.00	Miscellaneous scattered pieces of low relief debris, less than one foot in height.	Small Debris Field	

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C138	1	956046	640433	113.76	62.63	0.00	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2	Small Debris Field	
C139	1	956172	640622	71.77	108.14	0.00	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2	Small Debris Field	
C140	1	956182	640513	79.28	53.60	0.00	Miscellaneous scattered pieces of low to medium debris, ranging from less than a foot to 2 feet hi	Small Debris Field	M223
C141	1	956238	640526	19.63	83.34	0.00	Miscellaneous scattered pieces of low relief debris, less than a foot in height.	Small Debris Field	M224
C142	1	956238	641138	31.34	28.48	0.00	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2	Small Debris Field	
C143	1	956259	641234	26.69	26.70	0.00	Miscellaneous scattered pieces of medium relief debris, 1 to 2 feet in height.	Small Debris Field	
C144	1	956353	640915	18.42	19.05	1.57	Miscellaneous piece of debris.	Debris	
C145	1	956527	640318	1000.00	330.00	0.00	Miscellaneous scattered pieces of debris. 1000 feet by 330.	Large Debris Field	
C146	1	956541	640561	13.19	38.49	0.00	Miscellaneous scattered pieces of medium relief debris, 1 to 2 feet in height.	Small Debris Field	M225
C147	1	956590	640956	10.35	17.72	0.00	Miscellaneous two pieces of debris, 3 feet high.	Debris	M198
C148	1	956595	640687	56.73	13.89	3.03	Large mound like feature.	Seafloor Feature	
C149	1	956814	640717	200.00	150.00	2.20	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2	Small Debris Field	
C150	1	957098	641185	17.25	20.00	0.00	Miscellaneous two pieces of debris, 2 feet high.	Debris	M257
C151	1	957102	640996	33.12	32.18	1.21	Mound???	Seafloor Feature	

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C152	1	957137	640890	120.03	32.38	3.60		Seafloor Feature	
C153	1	957145	641220	25.88	18.07	0.00	Miscellaneous two pieces of debris, 1 foot in height.	Debris	M256
C154	1	957158	640994	50.00	20.00	0.00			
C155	1	957172	640985	6.91	5.60	0.88	Miscellaneous piece of debris.	Debris	
C156	1	957184	641146	58.42	21.91	2.06	Mound like structure.	Seafloor Feature	
C157	1	957187	640962	10.45	7.60	2.21	Miscellaneous piece of debris.	Debris	
C158	1	957197	641024	12.98	7.79	1.77	Miscellaneous piece of debris.	Debris	
C159	1	957203	641013	10.41	7.82	2.04	Miscellaneous piece of debris.	Debris	
C160	1	957218	640994	12.67	9.57	1.87	Miscellaneous piece of debris.	Debris	
C161	1	957222	640999	20.91	15.60	0.00	Miscellaneous pieces of debris, about 1 foot in height.	Debris	
C162	1	957233	641007	70.00	100.00	0.00	Miscellaneous three pieces of debris, 2 to 3 feet in height.	Debris	
C163	1	957254	641107	31.05	38.47	0.00	Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2	Small Debris Field	
C164	1	957258	641199	60.00	100.00	0.00	Miscellaneous scattered pieces of medium to high relief debris, ranging from 1 to 3 feet high.	Small Debris Field	
C165	1	957284	640899	14.64	11.02	2.90	Apparent mound.	Seafloor Feature	
C166	1	957316	640833	13.75	4.15	0.59	Miscellaneous piece of debris.	Debris	
C167	1	957328	641133	40.00	70.00	0.00	Miscellaneous scattered low relief pieces of debris, 1 foot and less in height.	Small Debris Field	
C168	1	957344	640957	22.47	150.00	3.50	Apparent mound.	Seafloor Feature	M196
C169	1	957350	640984	55.43	19.07	1.46	Apparent mounds.	Seafloor Feature	
C170	1	957363	640877	23.63	10.03	1.42	Miscellaneous piece of debris.	Debris	
C171	1	957405	641132	67.93	29.87	0.00	Miscellaneous scattered pieces of low to medium relief debris, ranging from a foot to 3 feet high.	Small Debris Field	
C172	1	957409	640979	21.85	10.80	3.28	Apparent mound.	Seafloor Feature	

Target	Map	E	N	Length	Width	Height	Description	Type	Association
C173	1	957418	640851	24.12	32.40	0.00	Miscellaneous three pieces of debris, about 1 foot in height.	Debris	
C174	1	957418	640967	148.97	43.82	3.59	Apparent mounds.	Seafloor Feature	

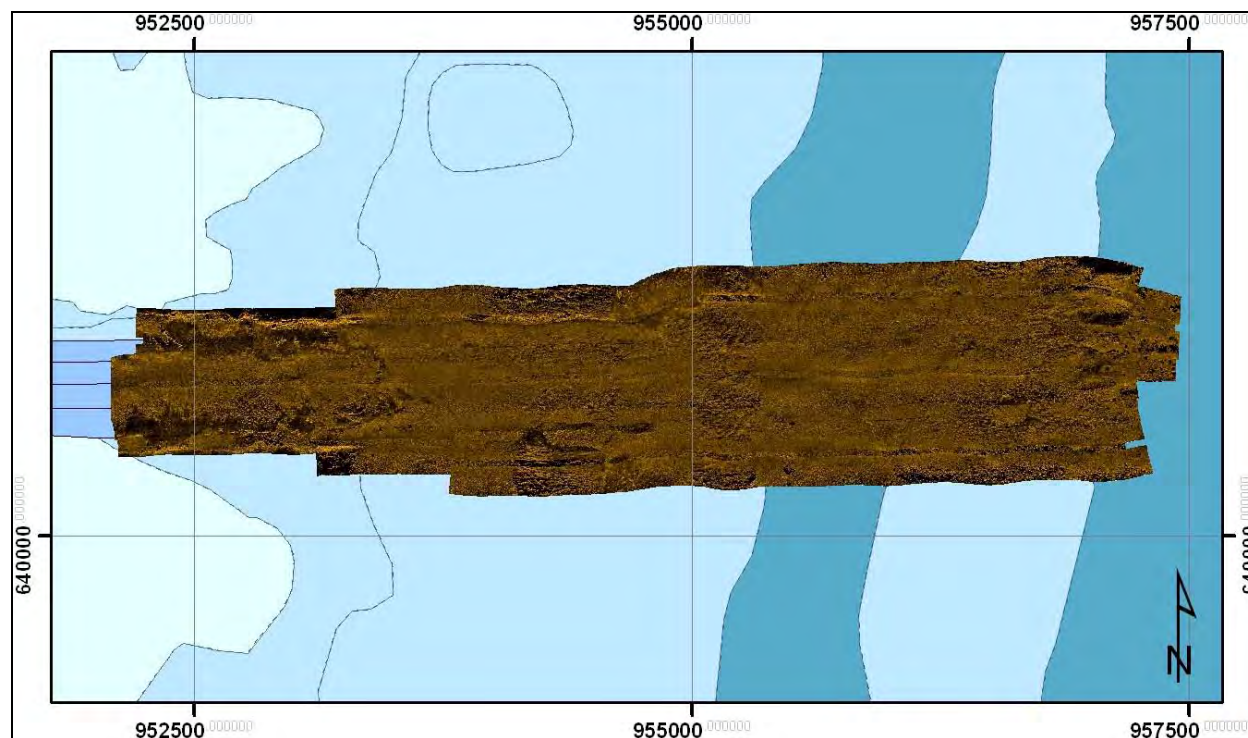


Figure 4-16. Sidescan sonar mosaic of channel survey area.

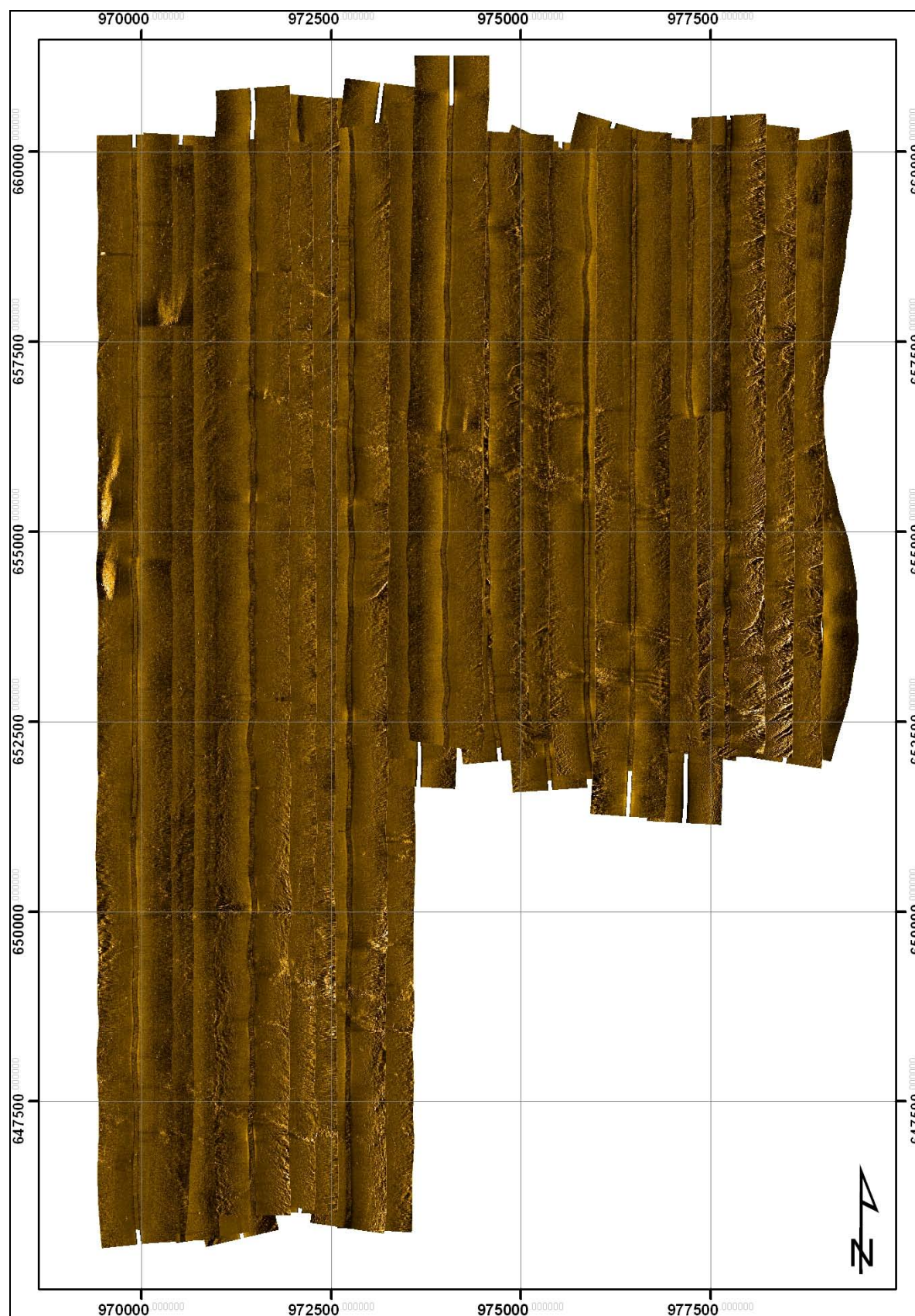
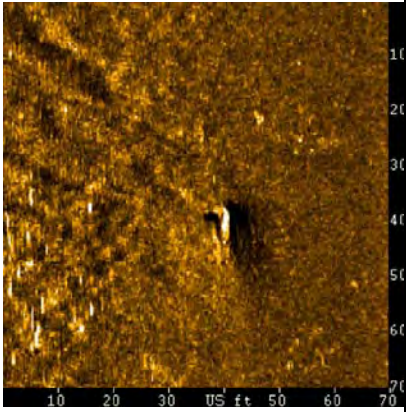
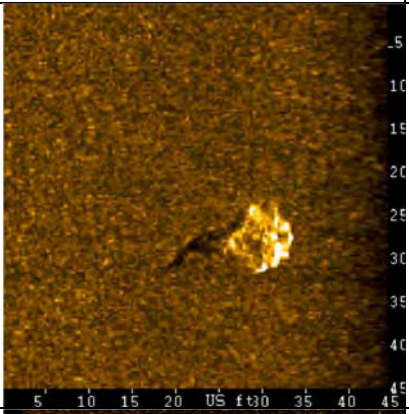
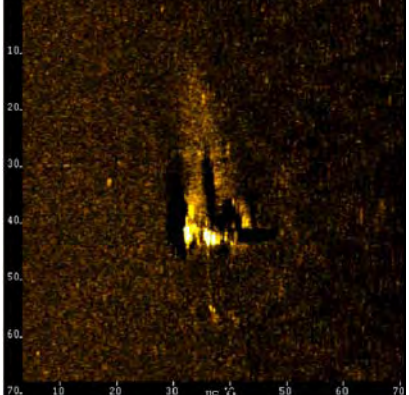
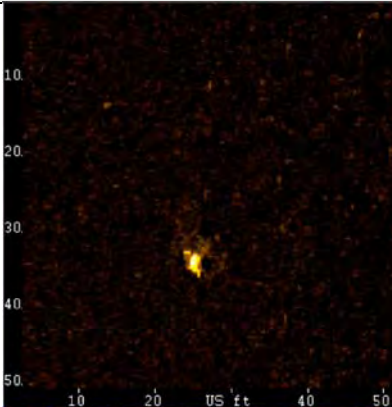
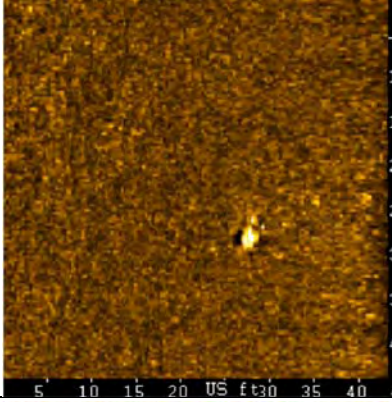
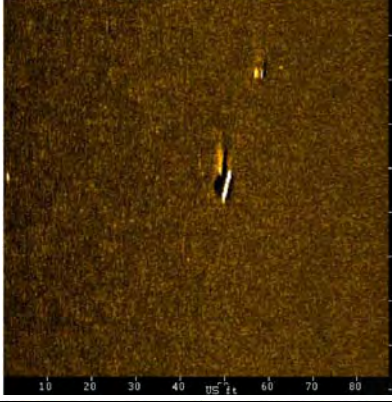
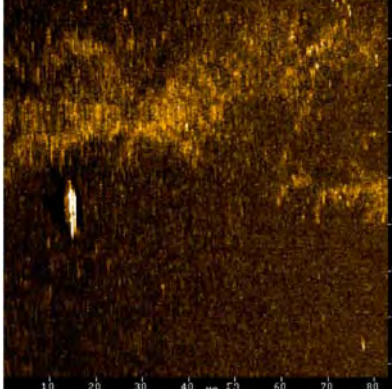
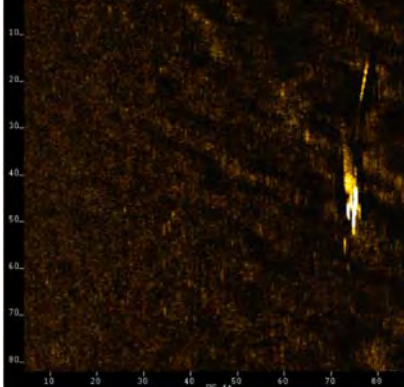
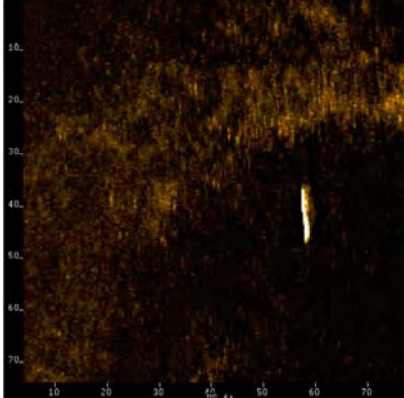
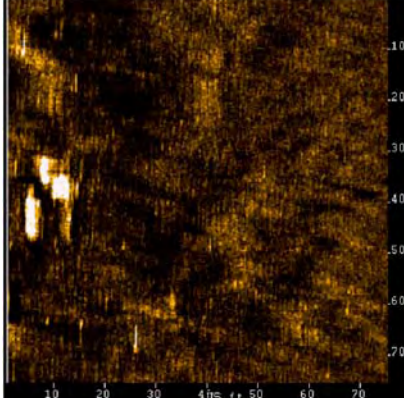
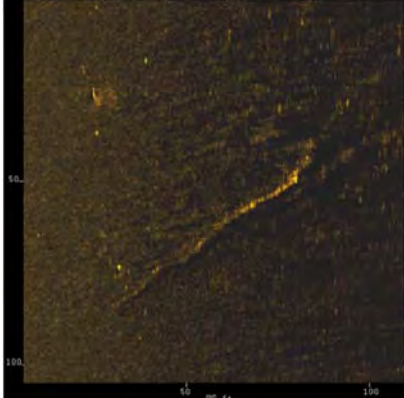


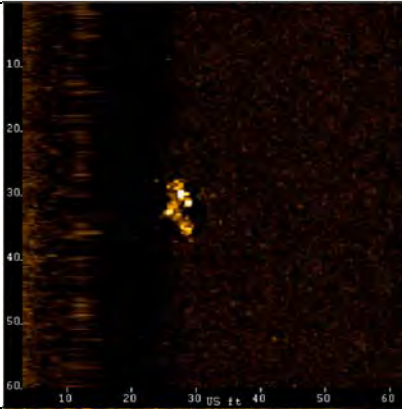
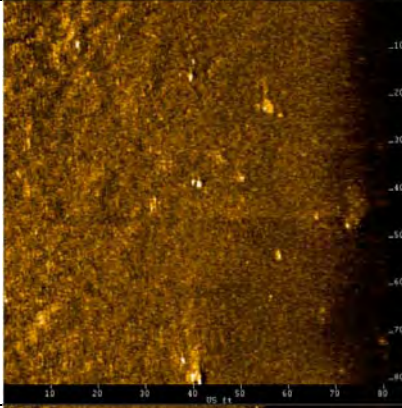
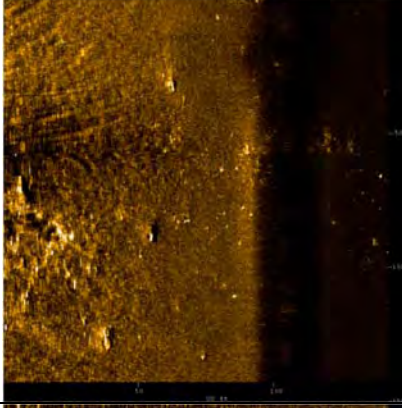
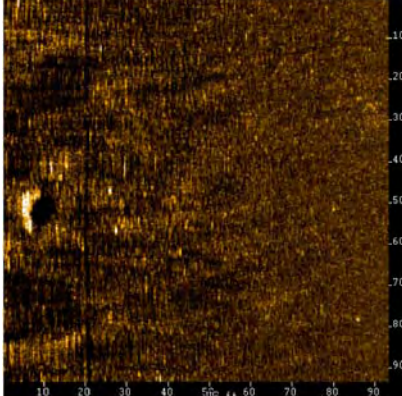
Figure 4-17. Sidescan sonar mosaic for the ODMDS survey area showing total coverage.

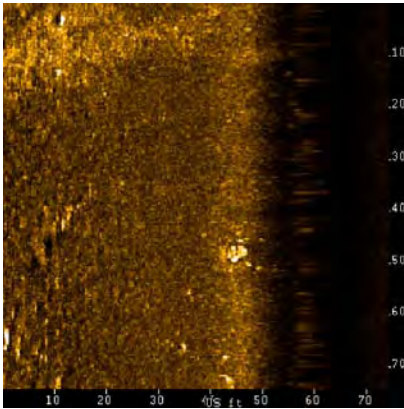
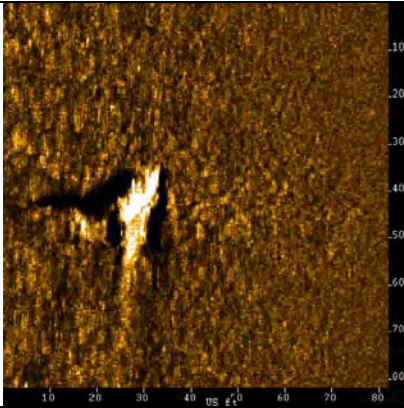
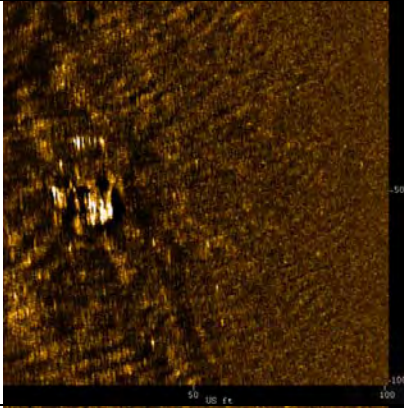
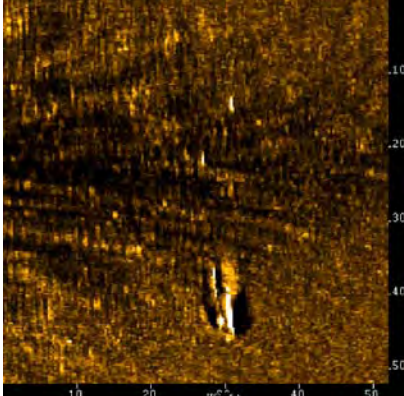
Table 4-05. ODMDS Sidescan Sonar Target Images.

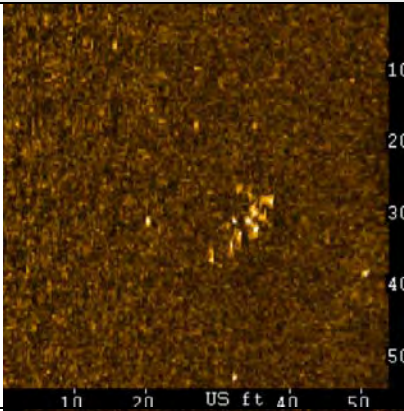
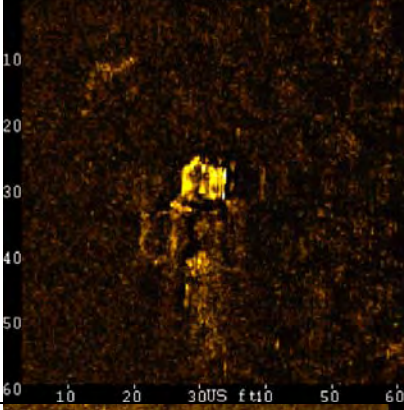
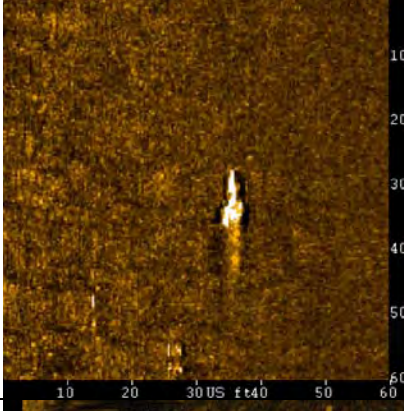
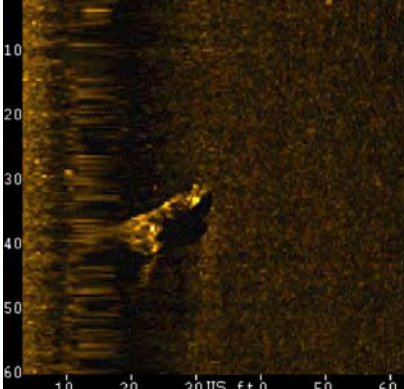
Contact Image	Contact Info	User Entered Info
	Target 001 <ul style="list-style-type: none"> Sonar Time at Target: 11/13/2011 20:58:00 Target Position (X) 977038.63 (Y) 652257.81 Map Projection: FL83-EF Range to Target: 49.77 US Feet Fish Height: 13.70 US Feet Heading: 356.200 degrees Line Name: 232_111113155500 	Dimensions Target Height: 0.00 US Feet Target Length: 23.14 US Feet Target Shadow: 0.00 US Feet Target Width: 18.82 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: ODMDS Description: Apparent large depression with possible piece of debris inside
	Target 002 <ul style="list-style-type: none"> Sonar Time at Target: 11/14/2011 06:54:32 Target Position (X) 972520.38 (Y) 658787.00 Map Projection: FL83-EF Range to Target: 26.17 US Feet Fish Height: 14.36 US Feet Heading: 195.700 degrees Line Name: 18_111114014700 	Dimensions Target Height: 7.75 US Feet Target Length: 22.00 US Feet Target Shadow: 16.90 US Feet Target Width: 22.56 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 003 <ul style="list-style-type: none"> Sonar Time at Target: 11/14/2011 06:58:38 Target Position (X) 972224.00 (Y) 657579.44 Map Projection: FL83-EF Range to Target: 67.27 US Feet Fish Height: 14.94 US Feet Heading: 194.700 degrees Line Name: 18_111114014700 	Dimensions Target Height: 0.72 US Feet Target Length: 30.22 US Feet Target Shadow: 3.30 US Feet Target Width: 33.74 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

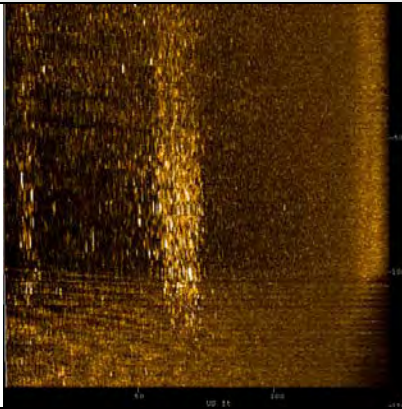
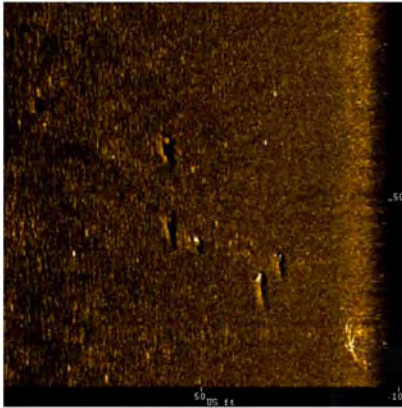
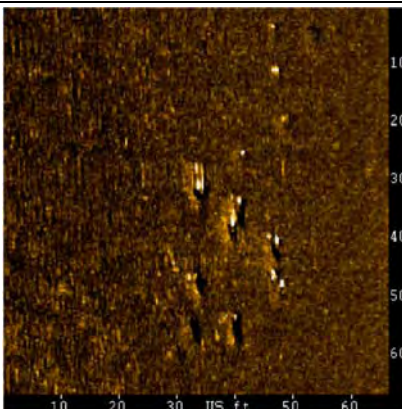
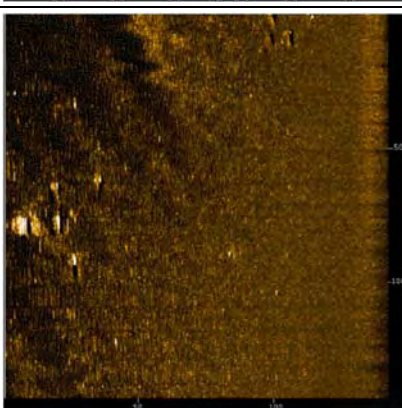
Contact Image	Contact Info	User Entered Info
	Target 004 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 07:33:02 • Target Position (X) 972488.38 (Y) 647727.19 • Map Projection: FL83-EF • Range to Target: 43.59 US Feet • Fish Height: 16.15 US Feet • Heading: 191.100 degrees • Line Name: 18_111114021700 	Dimensions Target Height: 2.27 US Feet Target Length: 6.22 US Feet Target Shadow: 6.39 US Feet Target Width: 6.39 US Feet Mag Anomaly: 82 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 005 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 07:33:33 • Target Position (X) 972658.50 (Y) 647529.19 • Map Projection: FL83-EF • Range to Target: 28.34 US Feet • Fish Height: 14.25 US Feet • Heading: 191.000 degrees • Line Name: 18_111114021700 	Dimensions Target Height: 1.95 US Feet Target Length: 8.25 US Feet Target Shadow: 4.05 US Feet Target Width: 7.08 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 006 <ul style="list-style-type: none"> • Sonar Time at Target: 11/10/2011 21:57:55 • Target Position (X) 975714.75 (Y) 653661.94 • Map Projection: FL83-EF • Range to Target: 57.48 US Feet • Fish Height: 15.43 US Feet • Heading: 192.400 degrees • Line Name: 27_111110164000 	Dimensions Target Height: 1.43 US Feet Target Length: 25.02 US Feet Target Shadow: 5.47 US Feet Target Width: 3.66 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of linear debris and miscellaneous small piece of debris
	Target 007 <ul style="list-style-type: none"> • Sonar Time at Target: 11/10/2011 21:59:46 • Target Position (X) 975904.56 (Y) 653040.00 • Map Projection: FL83-EF • Range to Target: 106.82 US Feet • Fish Height: 14.22 US Feet • Heading: 194.500 degrees • Line Name: 27_111110164000 	Dimensions Target Height: 1.40 US Feet Target Length: 35.54 US Feet Target Shadow: 10.82 US Feet Target Width: 8.62 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

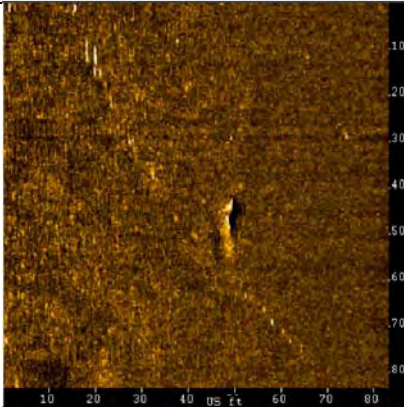
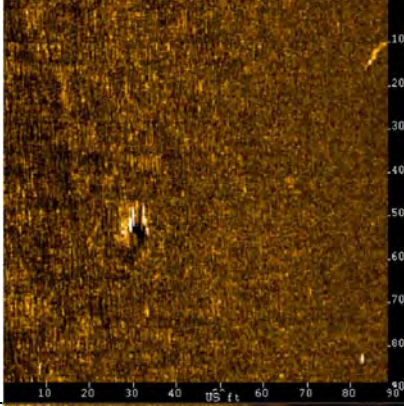
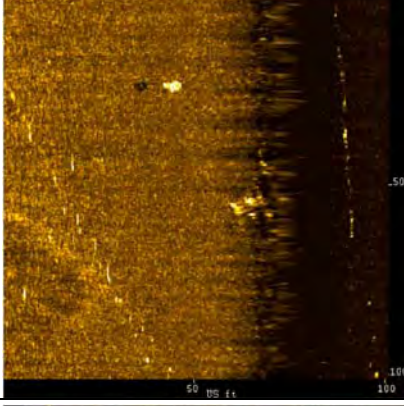
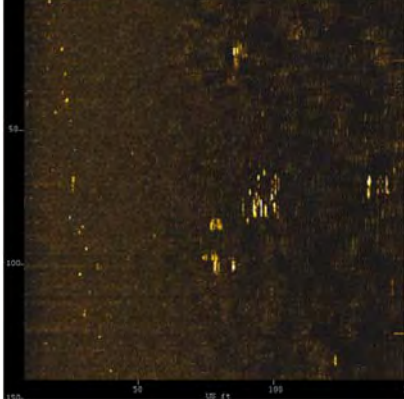
Contact Image	Contact Info	User Entered Info
	Target 008 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 00:50:06 • Target Position (X) 975725.31 (Y) 653588.56 • Map Projection: FL83-EF • Range to Target: 131.28 US Feet • Fish Height: 18.83 US Feet • Heading: 190.100 degrees • Line Name: 29_111110192700 	Dimensions Target Height: 1.39 US Feet Target Length: 65.95 US Feet Target Shadow: 9.92 US Feet Target Width: 8.50 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 009 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 00:52:42 • Target Position (X) 975900.31 (Y) 652968.88 • Map Projection: FL83-EF • Range to Target: 94.48 US Feet • Fish Height: 14.99 US Feet • Heading: 196.500 degrees • Line Name: 29_111110192700 	Dimensions Target Height: 0.76 US Feet Target Length: 34.52 US Feet Target Shadow: 4.89 US Feet Target Width: 7.62 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of linear debris.
	Target 010 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 01:22:09 • Target Position (X) 973211.31 (Y) 652693.19 • Map Projection: FL83-EF • Range to Target: 140.42 US Feet • Fish Height: 13.92 US Feet • Heading: 345.100 degrees • Line Name: 21_111110201900 	Dimensions Target Height: 0.00 US Feet Target Length: 45.24 US Feet Target Shadow: 0.00 US Feet Target Width: 26.21 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 011 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 01:34:48 • Target Position (X) 973971.25 (Y) 657186.75 • Map Projection: FL83-EF • Range to Target: 85.29 US Feet • Fish Height: 12.45 US Feet • Heading: 343.200 degrees • Line Name: 21_111110201900 	Dimensions Target Height: 0.85 US Feet Target Length: 226.76 US Feet Target Shadow: 5.97 US Feet Target Width: 4.81 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous linear piece of debris.

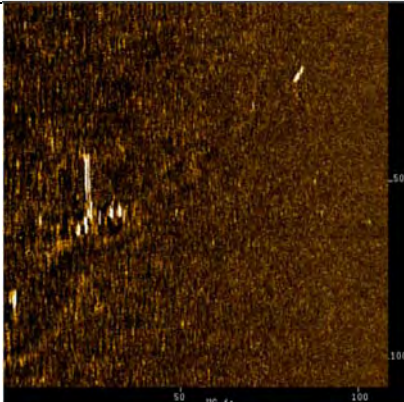
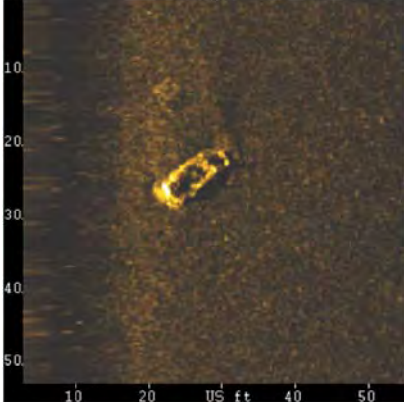
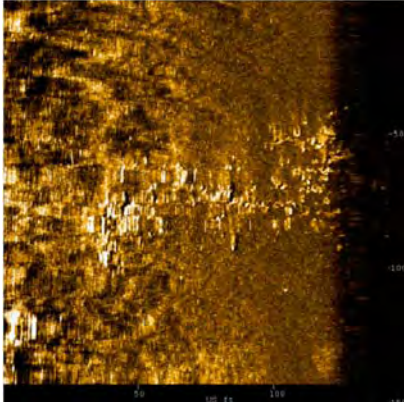
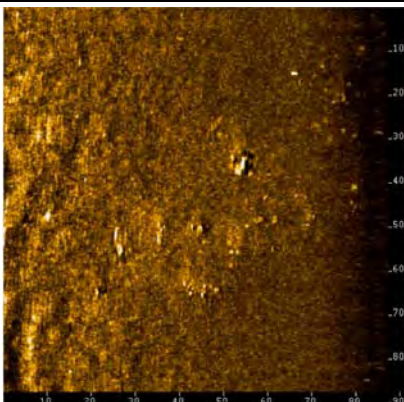
Contact Image	Contact Info	User Entered Info
	Target 012 <ul style="list-style-type: none"> Sonar Time at Target: 11/11/2011 02:27:27 Target Position (X) 978445.00 (Y) 656366.50 Map Projection: FL83-EF Range to Target: 20.86 US Feet Fish Height: 14.32 US Feet Heading: 196.300 degrees Line Name: 36_111110211400 	Dimensions Target Height: 4.01 US Feet Target Length: 26.34 US Feet Target Shadow: 6.39 US Feet Target Width: 9.59 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 013 <ul style="list-style-type: none"> Sonar Time at Target: 11/11/2011 02:31:15 Target Position (X) 978602.38 (Y) 655336.31 Map Projection: FL83-EF Range to Target: 39.24 US Feet Fish Height: 15.28 US Feet Heading: 198.600 degrees Line Name: 36_111110211400 	Dimensions Target Height: 0.00 US Feet Target Length: 194.42 US Feet Target Shadow: 0.00 US Feet Target Width: 148.91 US Feet Mag Anomaly: N/A Classification: Debris Field Area: ODMDS Description: Scattered pieces of small low relief debris.
	Target 014 <ul style="list-style-type: none"> Sonar Time at Target: 11/11/2011 02:32:16 Target Position (X) 978584.06 (Y) 655071.13 Map Projection: FL83-EF Range to Target: 30.73 US Feet Fish Height: 11.16 US Feet Heading: 194.700 degrees Line Name: 36_111110211400 	Dimensions Target Height: 0.00 US Feet Target Length: 329.08 US Feet Target Shadow: 0.00 US Feet Target Width: 356.60 US Feet Mag Anomaly: N/A Classification: Debris Field Area: ODMDS Description: Scattered pieces of low relief debris.
	Target 015 <ul style="list-style-type: none"> Sonar Time at Target: 11/11/2011 05:11:27 Target Position (X) 974564.06 (Y) 657097.19 Map Projection: FL83-EF Range to Target: 118.80 US Feet Fish Height: 9.83 US Feet Heading: 350.900 degrees Line Name: 25_111110235800 	Dimensions Target Height: 0.00 US Feet Target Length: 29.65 US Feet Target Shadow: 0.00 US Feet Target Width: 19.58 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: ODMDS Description: Apparent depression.

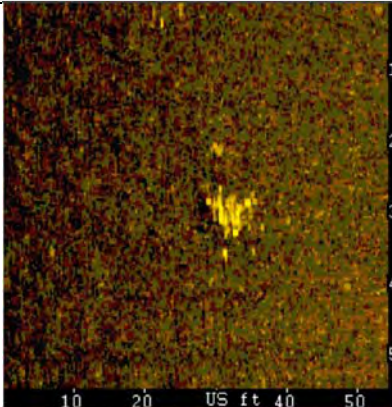
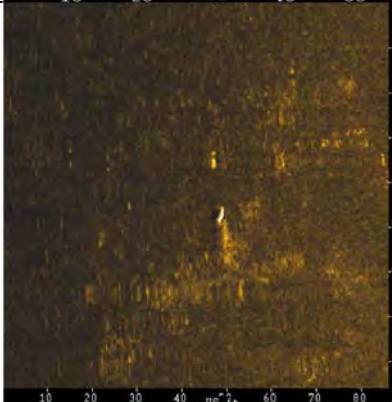
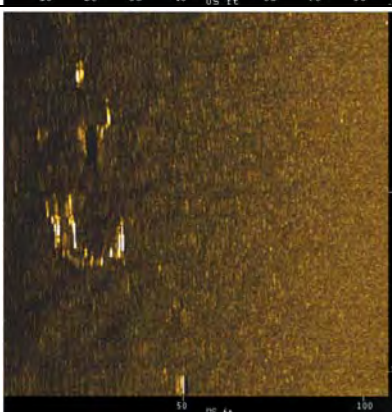
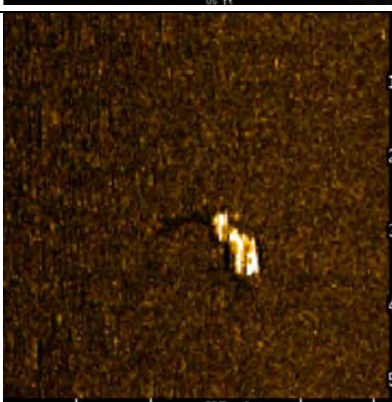
Contact Image	Contact Info	User Entered Info
	Target 016 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 10:02:20 • Target Position (X) 976764.50 (Y) 655398.63 • Map Projection: FL83-EF • Range to Target: 18.29 US Feet • Fish Height: 11.38 US Feet • Heading: 340.400 degrees • Line Name: 31_111111045200 	Dimensions Target Height: 0.00 US Feet Target Length: 87.40 US Feet Target Shadow: 0.00 US Feet Target Width: 37.26 US Feet Mag Anomaly: N/A Classification: Debris Field Area: ODMDS Block: Description: Scattered miscellaneous pieces of small low relief debris.
	Target 017 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 10:04:10 • Target Position (X) 976535.50 (Y) 656069.63 • Map Projection: FL83-EF • Range to Target: 94.77 US Feet • Fish Height: 15.02 US Feet • Heading: 345.100 degrees • Line Name: 31_111111045200 	Dimensions Target Height: 6.90 US Feet Target Length: 53.05 US Feet Target Shadow: 50.67 US Feet Target Width: 21.05 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris
	Target 018 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 10:44:37 • Target Position (X) 974412.25 (Y) 659705.31 • Map Projection: FL83-EF • Range to Target: 108.05 US Feet • Fish Height: 10.38 US Feet • Heading: 199.100 degrees • Line Name: 23_111111054300 	Dimensions Target Height: 0.20 US Feet Target Length: 46.41 US Feet Target Shadow: 2.04 US Feet Target Width: 22.92 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 019 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 11:02:06 • Target Position (X) 974303.00 (Y) 655142.31 • Map Projection: FL83-EF • Range to Target: 63.60 US Feet • Fish Height: 11.76 US Feet • Heading: 206.300 degrees • Line Name: 23_111111054300 	Dimensions Target Height: 0.88 US Feet Target Length: 28.21 US Feet Target Shadow: 4.85 US Feet Target Width: 6.94 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.


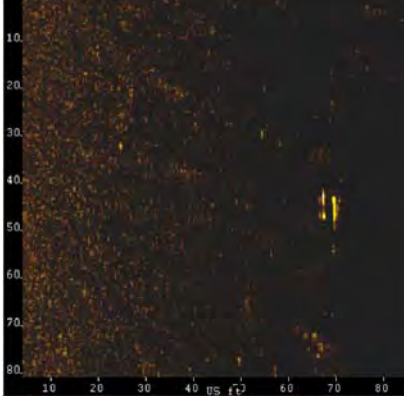
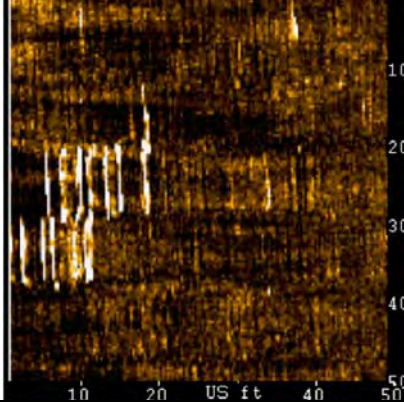
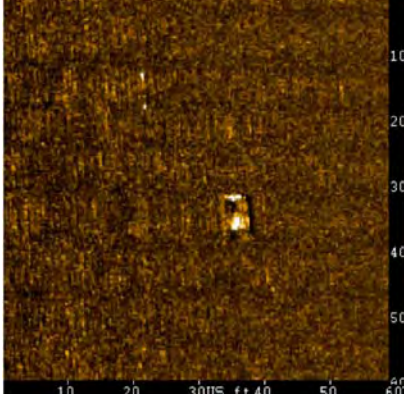
Contact Image	Contact Info	User Entered Info
 <p>A sonar image showing a small, bright, irregularly shaped object on a dark, grainy background. The object is located in the upper right quadrant of the image. The image has a vertical scale on the right side from 10 to 50 and a horizontal scale at the bottom from 10 to 50, both labeled 'US ft'.</p>	<p>Target 020</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 12:45:25 • Target Position (X) 973777.88 (Y) 659216.75 • Map Projection: FL83-EF • Range to Target: 37.26 US Feet • Fish Height: 14.28 US Feet • Heading: 195.600 degrees • Line Name: 22_11111074100 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 23.33 US Feet Target Shadow: 0.00 US Feet Target Width: 12.89 US Feet Mag Anomaly: 3, 28 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.</p>
 <p>A sonar image showing a small, bright, irregularly shaped object on a dark, grainy background. The object is located in the upper right quadrant of the image. The image has a vertical scale on the right side from 10 to 60 and a horizontal scale at the bottom from 10 to 60, both labeled 'US ft'.</p>	<p>Target 021</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/13/2011 22:38:58 • Target Position (X) 976033.44 (Y) 653393.06 • Map Projection: FL83-EF • Range to Target: 53.50 US Feet • Fish Height: 15.21 US Feet • Heading: 350.100 degrees • Line Name: 228_111113173400 	<p>Dimensions</p> <p>Target Height: 1.08 US Feet Target Length: 19.12 US Feet Target Shadow: 3.89 US Feet Target Width: 21.54 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.</p>
 <p>A sonar image showing a small, bright, irregularly shaped object on a dark, grainy background. The object is located in the upper right quadrant of the image. The image has a vertical scale on the right side from 10 to 60 and a horizontal scale at the bottom from 10 to 60, both labeled 'US ft'.</p>	<p>Target 022</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/13/2011 22:39:58 • Target Position (X) 975685.81 (Y) 653753.44 • Map Projection: FL83-EF • Range to Target: 53.32 US Feet • Fish Height: 15.59 US Feet • Heading: 346.100 degrees • Line Name: 228_111113173400 	<p>Dimensions</p> <p>Target Height: 0.84 US Feet Target Length: 28.01 US Feet Target Shadow: 2.93 US Feet Target Width: 9.93 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.</p>
 <p>A sonar image showing a small, bright, irregularly shaped object on a dark, grainy background. The object is located in the upper right quadrant of the image. The image has a vertical scale on the right side from 10 to 60 and a horizontal scale at the bottom from 10 to 60, both labeled 'US ft'.</p>	<p>Target 023</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 00:47:45 • Target Position (X) 976512.25 (Y) 656108.63 • Map Projection: FL83-EF • Range to Target: 18.94 US Feet • Fish Height: 12.06 US Feet • Heading: 346.000 degrees • Line Name: 30_111113193500 	<p>Dimensions</p> <p>Target Height: 9.24 US Feet Target Length: 40.07 US Feet Target Shadow: 18.93 US Feet Target Width: 8.04 US Feet Mag Anomaly: 38 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.</p>

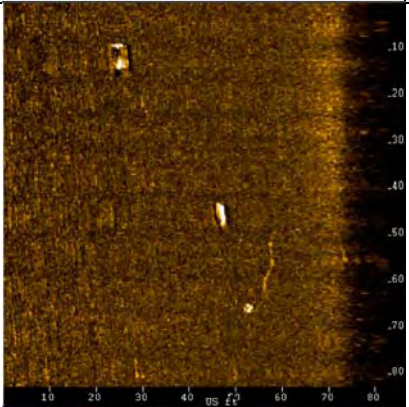
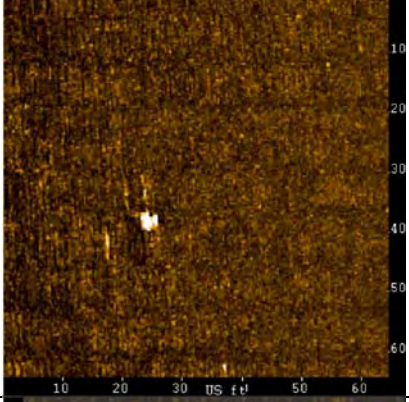
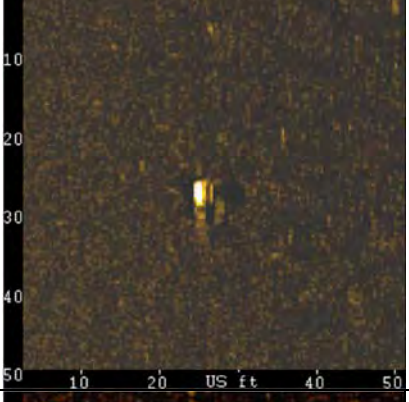
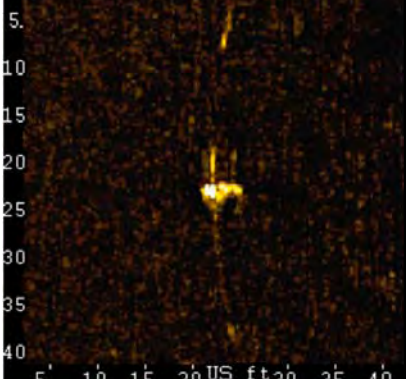
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	Target 024 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 01:39:02 • Target Position (X) 974278.00 (Y) 656410.25 • Map Projection: FL83-EF • Range to Target: 88.13 US Feet • Fish Height: 7.97 US Feet • Heading: 197.100 degrees • Line Name: 223_111113202300 	Dimensions Target Height: 0.00 US Feet Target Length: 273.71 US Feet Target Shadow: 0.00 US Feet Target Width: 59.39 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: ODMDS Description: Area of high reflectivity.
	Target 025 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 02:46:57 • Target Position (X) 971087.81 (Y) 646310.38 • Map Projection: FL83-EF • Range to Target: 49.17 US Feet • Fish Height: 9.53 US Feet • Heading: 345.100 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.00 US Feet Target Length: 100.09 US Feet Target Shadow: 0.00 US Feet Target Width: 165.03 US Feet Mag Anomaly: N/A Classification: Debris Field Area: ODMDS Description: Scattered miscellaneous pieces of small low relief debris
	Target 026 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 02:48:08 • Target Position (X) 971087.44 (Y) 646743.00 • Map Projection: FL83-EF • Range to Target: 46.36 US Feet • Fish Height: 9.78 US Feet • Heading: 349.200 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.00 US Feet Target Length: 30.00 US Feet Target Shadow: 0.00 US Feet Target Width: 25.00 US Feet Mag Anomaly: N/A Classification: Debris Field Area: ODMDS Description: Scattered miscellaneous pieces of low relief debris.
	Target 027 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 02:48:49 • Target Position (X) 970795.13 (Y) 647010.69 • Map Projection: FL83-EF • Range to Target: 132.53 US Feet • Fish Height: 11.30 US Feet • Heading: 347.800 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.00 US Feet Target Length: 109.65 US Feet Target Shadow: 0.00 US Feet Target Width: 63.34 US Feet Mag Anomaly: 59, 61 Classification: Debris Field Area: ODMDS Description: Scattered miscellaneous pieces of small low relief debris.

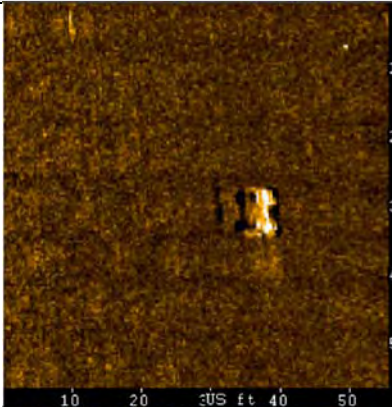
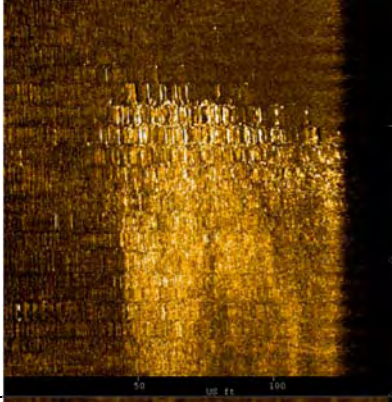
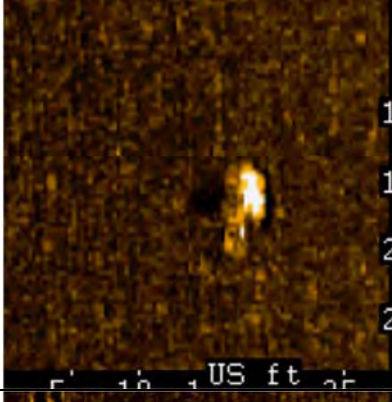
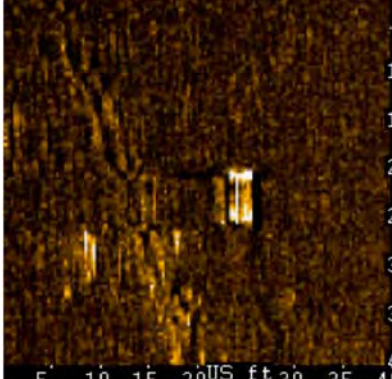
Contact Image	Contact Info	User Entered Info
	Target 028 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 03:01:36 • Target Position (X) 971102.13 (Y) 652004.50 • Map Projection: FL83-EF • Range to Target: 52.95 US Feet • Fish Height: 14.10 US Feet • Heading: 351.000 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.00 US Feet Target Length: 27.88 US Feet Target Shadow: 0.00 US Feet Target Width: 8.66 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: ODMDS Description: Apparent depression.
	Target 029 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 03:02:25 • Target Position (X) 970962.00 (Y) 652325.00 • Map Projection: FL83-EF • Range to Target: 95.01 US Feet • Fish Height: 14.48 US Feet • Heading: 352.300 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.00 US Feet Target Length: 13.15 US Feet Target Shadow: 0.00 US Feet Target Width: 13.26 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 030 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 03:03:32 • Target Position (X) 971229.00 (Y) 652775.81 • Map Projection: FL83-EF • Range to Target: 19.08 US Feet • Fish Height: 14.87 US Feet • Heading: 349.500 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.00 US Feet Target Length: 7.99 US Feet Target Shadow: 0.00 US Feet Target Width: 24.75 US Feet Mag Anomaly: 49 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris with nearby scarring.
	Target 031 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 03:04:13 • Target Position (X) 971581.50 (Y) 653041.06 • Map Projection: FL83-EF • Range to Target: 96.96 US Feet • Fish Height: 13.73 US Feet • Heading: 354.300 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.00 US Feet Target Length: 262.05 US Feet Target Shadow: 0.00 US Feet Target Width: 217.47 US Feet Mag Anomaly: N/A Classification: Debris Field Area: ODMDS Description: Scattered miscellaneous pieces of medium to large low relief debris

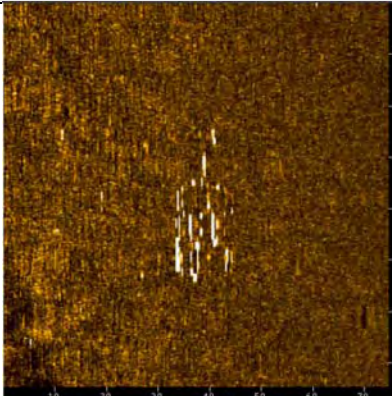
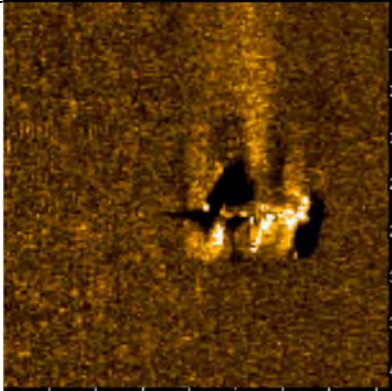
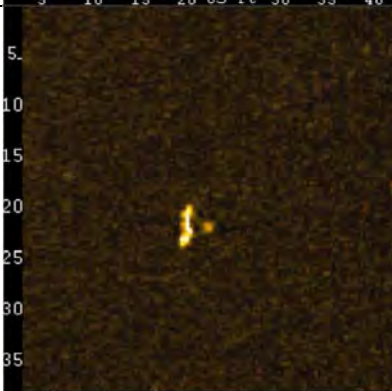
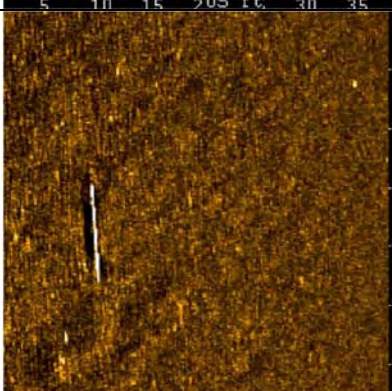
Contact Image	Contact Info	User Entered Info
	Target 032 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 03:10:13 • Target Position (X) 970911.38 (Y) 655348.44 • Map Projection: FL83-EF • Range to Target: 108.03 US Feet • Fish Height: 9.97 US Feet • Heading: 349.000 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.66 US Feet Target Length: 64.12 US Feet Target Shadow: 7.33 US Feet Target Width: 15.33 US Feet Mag Anomaly: 71, 72 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 033 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 04:09:36 • Target Position (X) 972676.81 (Y) 654321.75 • Map Projection: FL83-EF • Range to Target: 26.40 US Feet • Fish Height: 11.72 US Feet • Heading: 194.700 degrees • Line Name: 19_111113224900 	Dimensions Target Height: 0.00 US Feet Target Length: 23.27 US Feet Target Shadow: 0.00 US Feet Target Width: 16.40 US Feet Mag Anomaly: 57 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris
	Target 034 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 04:26:29 • Target Position (X) 972923.25 (Y) 648898.38 • Map Projection: FL83-EF • Range to Target: 58.27 US Feet • Fish Height: 13.90 US Feet • Heading: 193.000 degrees • Line Name: 19_111113231900 	Dimensions Target Height: 0.00 US Feet Target Length: 113.11 US Feet Target Shadow: 0.00 US Feet Target Width: 353.50 US Feet Mag Anomaly: N/A Classification: Debris Field Area: ODMDS Description: Scattered miscellaneous pieces of small low relief debris.
	Target 035 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 04:32:20 • Target Position (X) 972859.50 (Y) 646990.25 • Map Projection: FL83-EF • Range to Target: 42.55 US Feet • Fish Height: 14.66 US Feet • Heading: 190.400 degrees • Line Name: 19_111113231900 	Dimensions Target Height: 0.00 US Feet Target Length: 85.56 US Feet Target Shadow: 0.00 US Feet Target Width: 109.16 US Feet Mag Anomaly: N/A Classification: Debris Field Area: ODMDS Description: Scattered miscellaneous pieces of small low relief objects.

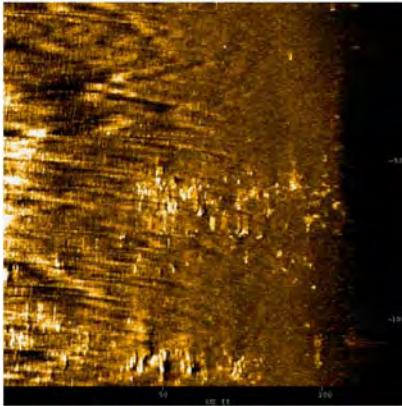
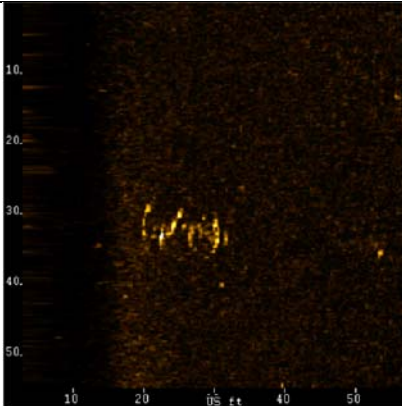
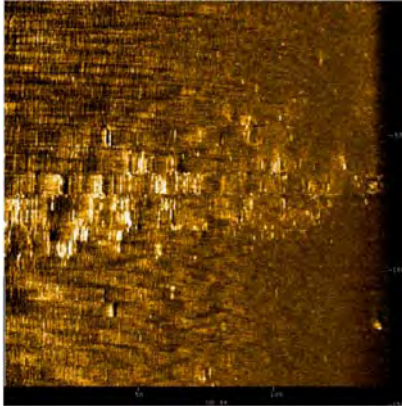
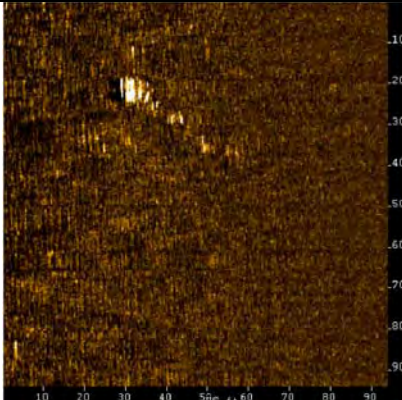
Contact Image	Contact Info	User Entered Info
 A sonar image showing a bright, irregularly shaped object on a dark, grainy background. The object is located in the center-right of the frame. A vertical scale on the right side of the image ranges from 10 to 50. A horizontal scale at the bottom ranges from 10 to 50 US ft.	Target 036 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 05:47:57 • Target Position (X) 970761.38 (Y) 646039.50 • Map Projection: FL83-EF • Range to Target: 43.14 US Feet • Fish Height: 11.90 US Feet • Heading: 339.200 degrees • Line Name: 213_111114004700 	Dimensions Target Height: 0.00 US Feet Target Length: 14.59 US Feet Target Shadow: 0.00 US Feet Target Width: 15.03 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 A sonar image showing a bright, elongated object on a dark, grainy background. The object is located in the center-right of the frame. A vertical scale on the right side of the image ranges from 10 to 80. A horizontal scale at the bottom ranges from 10 to 80 US ft.	Target 037 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 05:52:10 • Target Position (X) 970683.63 (Y) 647592.56 • Map Projection: FL83-EF • Range to Target: 55.97 US Feet • Fish Height: 12.32 US Feet • Heading: 352.900 degrees • Line Name: 213_111114004700 	Dimensions Target Height: 1.06 US Feet Target Length: 8.92 US Feet Target Shadow: 4.96 US Feet Target Width: 4.96 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 A sonar image showing a bright, U-shaped object on a dark, grainy background. The object is located in the center-left of the frame. A vertical scale on the right side of the image ranges from 10 to 100. A horizontal scale at the bottom ranges from 10 to 100 US ft.	Target 038 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 06:06:38 • Target Position (X) 970522.06 (Y) 653007.44 • Map Projection: FL83-EF • Range to Target: 110.08 US Feet • Fish Height: 10.22 US Feet • Heading: 352.900 degrees • Line Name: 213_111114004700 	Dimensions Target Height: 0.00 US Feet Target Length: 235.33 US Feet Target Shadow: 0.00 US Feet Target Width: 99.43 US Feet Mag Anomaly: 90 Classification: Debris Field Area: ODMDS Description: Scattered miscellaneous pieces of small to large low relief debris.
 A sonar image showing a bright, elongated object on a dark, grainy background. The object is located in the center-right of the frame. A vertical scale on the right side of the image ranges from 10 to 50. A horizontal scale at the bottom ranges from 10 to 50 US ft.	Target 039 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 06:07:33 • Target Position (X) 970719.19 (Y) 653363.56 • Map Projection: FL83-EF • Range to Target: 47.85 US Feet • Fish Height: 11.51 US Feet • Heading: 353.000 degrees • Line Name: 213_111114004700 	Dimensions Target Height: 4.02 US Feet Target Length: 23.96 US Feet Target Shadow: 0.00 US Feet Target Width: 12.34 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

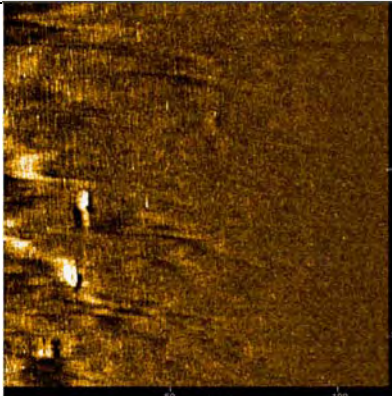
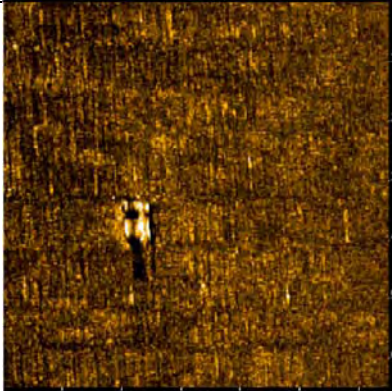

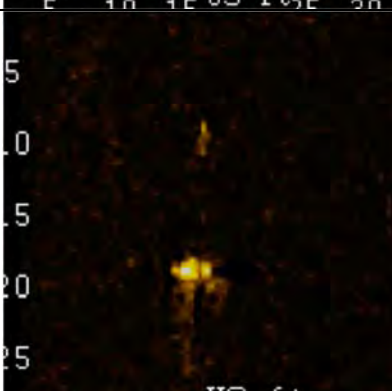
Contact Image	Contact Info	User Entered Info
	Target 040 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 06:08:00 • Target Position (X) 970750.63 (Y) 653542.94 • Map Projection: FL83-EF • Range to Target: 39.38 US Feet • Fish Height: 12.42 US Feet • Heading: 353.400 degrees • Line Name: 213_111114004700 	Dimensions Target Height: 3.21 US Feet Target Length: 3.99 US Feet Target Shadow: 11.06 US Feet Target Width: 8.56 US Feet Mag Anomaly: 69 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris
	Target 041 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 06:12:56 • Target Position (X) 971211.06 (Y) 655408.00 • Map Projection: FL83-EF • Range to Target: 99.32 US Feet • Fish Height: 10.16 US Feet • Heading: 348.600 degrees • Line Name: 213_111114004700 	Dimensions Target Height: 0.00 US Feet Target Length: 19.57 US Feet Target Shadow: 0.00 US Feet Target Width: 14.27 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 042 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 08:18:04 • Target Position (X) 970056.69 (Y) 650971.38 • Map Projection: FL83-EF • Range to Target: 140.42 US Feet • Fish Height: 14.37 US Feet • Heading: 351.300 degrees • Line Name: 12_111114030200 	Dimensions Target Height: 0.85 US Feet Target Length: 54.77 US Feet Target Shadow: 8.45 US Feet Target Width: 20.50 US Feet Mag Anomaly: 120 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 043 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 08:22:57 • Target Position (X) 970312.50 (Y) 652612.81 • Map Projection: FL83-EF • Range to Target: 61.59 US Feet • Fish Height: 13.44 US Feet • Heading: 353.600 degrees • Line Name: 12_111114030200 	Dimensions Target Height: 0.00 US Feet Target Length: 15.29 US Feet Target Shadow: 0.00 US Feet Target Width: 13.03 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

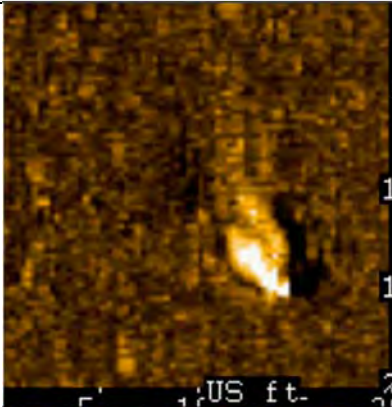
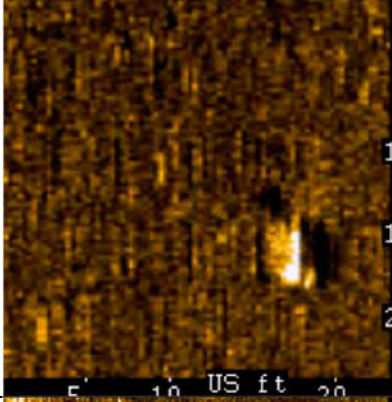
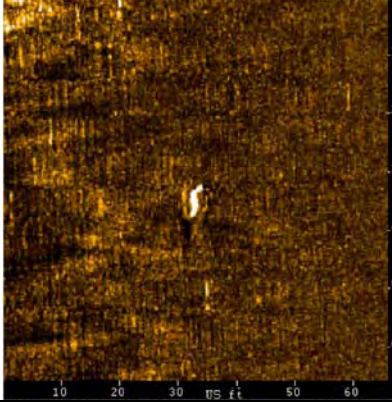
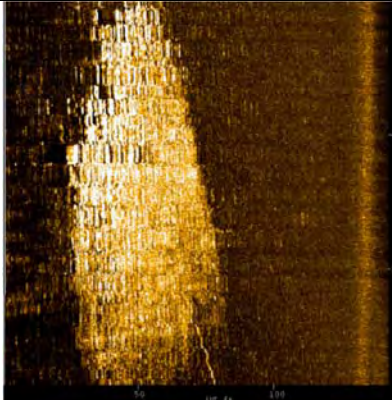
Contact Image	Contact Info	User Entered Info
 A sonar image showing a small, bright, rectangular object on a dark, textured seabed. A vertical depth scale on the right ranges from 10 to 80 feet. A horizontal range scale at the bottom ranges from 10 to 80 US feet.	Target 044 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 08:23:16 • Target Position (X) 970388.56 (Y) 652728.56 • Map Projection: FL83-EF • Range to Target: 39.20 US Feet • Fish Height: 13.60 US Feet • Heading: 354.100 degrees • Line Name: 12_111114030200 	Dimensions Target Height: 0.78 US Feet Target Length: 13.70 US Feet Target Shadow: 2.27 US Feet Target Width: 8.00 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 A sonar image showing a small, bright, rectangular object on a dark, textured seabed. A vertical depth scale on the right ranges from 10 to 60 feet. A horizontal range scale at the bottom ranges from 10 to 60 US feet.	Target 045 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 08:22:29 • Target Position (X) 970230.31 (Y) 652453.31 • Map Projection: FL83-EF • Range to Target: 87.50 US Feet • Fish Height: 14.32 US Feet • Heading: 353.000 degrees • Line Name: 12_111114030200 	Dimensions Target Height: 0.00 US Feet Target Length: 8.95 US Feet Target Shadow: 0.00 US Feet Target Width: 9.57 US Feet Mag Anomaly: 109 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 A sonar image showing a small, bright, rectangular object on a dark, textured seabed. A vertical depth scale on the left ranges from 10 to 50 feet. A horizontal range scale at the bottom ranges from 10 to 50 US feet.	Target 046 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 08:25:59 • Target Position (X) 970754.31 (Y) 653655.19 • Map Projection: FL83-EF • Range to Target: 72.48 US Feet • Fish Height: 15.47 US Feet • Heading: 356.200 degrees • Line Name: 12_111114030200 	Dimensions Target Height: 1.06 US Feet Target Length: 15.29 US Feet Target Shadow: 5.07 US Feet Target Width: 0.00 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 A sonar image showing a small, bright, rectangular object on a dark, textured seabed. A vertical depth scale on the left ranges from 5 to 40 feet. A horizontal range scale at the bottom ranges from 5 to 40 US feet.	Target 047 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 08:25:38 • Target Position (X) 970749.06 (Y) 653540.56 • Map Projection: FL83-EF • Range to Target: 70.89 US Feet • Fish Height: 14.44 US Feet • Heading: 351.100 degrees • Line Name: 12_111114030200 	Dimensions Target Height: 1.78 US Feet Target Length: 12.29 US Feet Target Shadow: 9.07 US Feet Target Width: 12.47 US Feet Mag Anomaly: 69 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

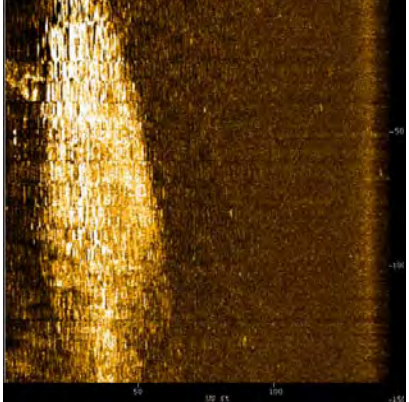
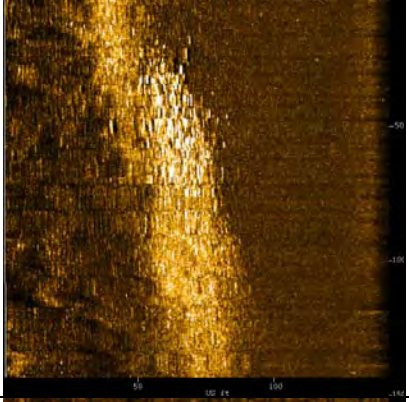
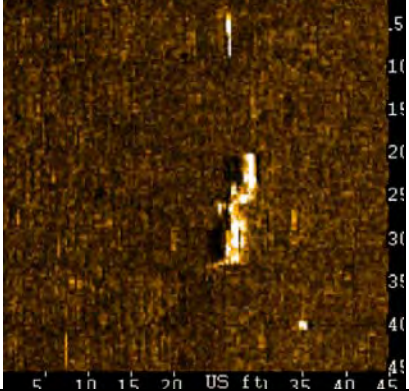
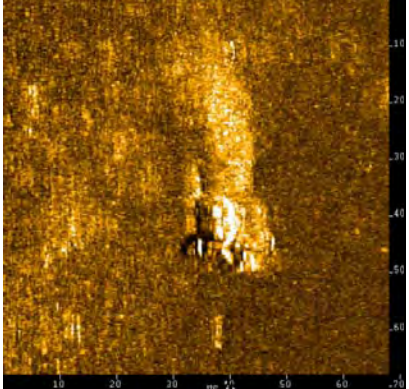
Contact Image	Contact Info	User Entered Info
	Target 048 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 08:35:02 • Target Position (X) 970399.31 (Y) 656761.50 • Map Projection: FL83-EF • Range to Target: 41.77 US Feet • Fish Height: 16.33 US Feet • Heading: 353.400 degrees • Line Name: 12_111114033200 	Dimensions Target Height: 5.70 US Feet Target Length: 22.53 US Feet Target Shadow: 0.00 US Feet Target Width: 0.00 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 049 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 08:38:06 • Target Position (X) 970327.13 (Y) 657809.63 • Map Projection: FL83-EF • Range to Target: 59.90 US Feet • Fish Height: 13.53 US Feet • Heading: 351.500 degrees • Line Name: 12_111114033200 	Dimensions Target Height: 0.00 US Feet Target Length: 369.34 US Feet Target Shadow: 0.00 US Feet Target Width: 258.79 US Feet Mag Anomaly: N/A Classification: Seafloor feature Area: ODMDS Description: Area of high reflectivity.
	Target 050 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 08:40:42 • Target Position (X) 970348.44 (Y) 658739.25 • Map Projection: FL83-EF • Range to Target: 52.44 US Feet • Fish Height: 10.15 US Feet • Heading: 352.100 degrees • Line Name: 12_111114033200 	Dimensions Target Height: 1.39 US Feet Target Length: 16.20 US Feet Target Shadow: 7.50 US Feet Target Width: 8.67 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 051 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 08:40:51 • Target Position (X) 970275.50 (Y) 658788.56 • Map Projection: FL83-EF • Range to Target: 74.12 US Feet • Fish Height: 10.68 US Feet • Heading: 351.500 degrees • Line Name: 12_111114033200 	Dimensions Target Height: 0.00 US Feet Target Length: 18.55 US Feet Target Shadow: 0.00 US Feet Target Width: 8.02 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Two miscellaneous pieces of debris.

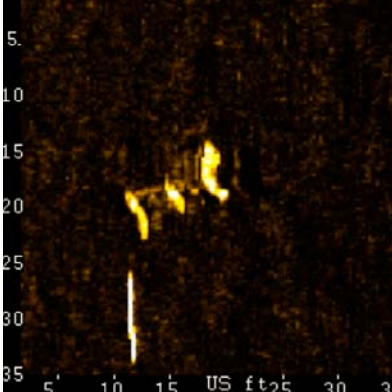
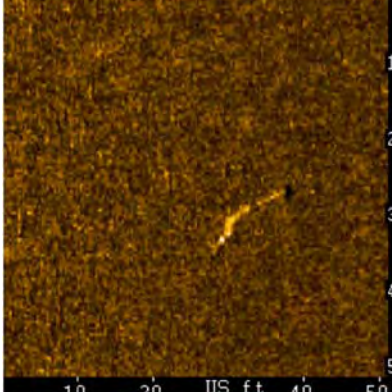
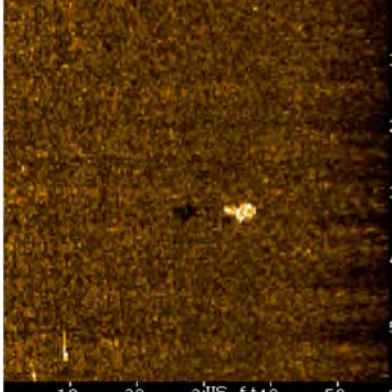
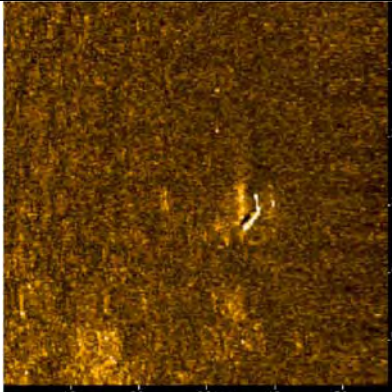
Contact Image	Contact Info	User Entered Info
	Target 052 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 09:21:49 • Target Position (X) 972372.38 (Y) 658618.06 • Map Projection: FL83-EF • Range to Target: 80.31 US Feet • Fish Height: 16.31 US Feet • Heading: 194.500 degrees • Line Name: 17_111114041400 	Dimensions Target Height: 0.00 US Feet Target Length: 75.80 US Feet Target Shadow: 0.00 US Feet Target Width: 37.20 US Feet Mag Anomaly: 77 Classification: Seafloor Feature Area: ODMDS Description: Area of high reflectivity.
	Target 053 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 09:25:31 • Target Position (X) 972217.63 (Y) 657596.19 • Map Projection: FL83-EF • Range to Target: 39.55 US Feet • Fish Height: 12.98 US Feet • Heading: 197.200 degrees • Line Name: 17_111114041400 	Dimensions Target Height: 5.19 US Feet Target Length: 16.65 US Feet Target Shadow: 18.03 US Feet Target Width: 28.89 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 054 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 09:40:16 • Target Position (X) 971973.31 (Y) 653557.38 • Map Projection: FL83-EF • Range to Target: 36.59 US Feet • Fish Height: 14.64 US Feet • Heading: 194.100 degrees • Line Name: 17_111114041400 	Dimensions Target Height: 0.00 US Feet Target Length: 13.48 US Feet Target Shadow: 0.00 US Feet Target Width: 8.90 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 055 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 14:38:16 • Target Position (X) 971743.94 (Y) 652231.06 • Map Projection: FL83-EF • Range to Target: 97.31 US Feet • Fish Height: 14.46 US Feet • Heading: 199.000 degrees • Line Name: 15_111114093600 	Dimensions Target Height: 0.83 US Feet Target Length: 28.81 US Feet Target Shadow: 5.67 US Feet Target Width: 5.19 US Feet Mag Anomaly: 115 Classification: Debris Area: ODMDS Description: Miscellaneous linear piece of debris.

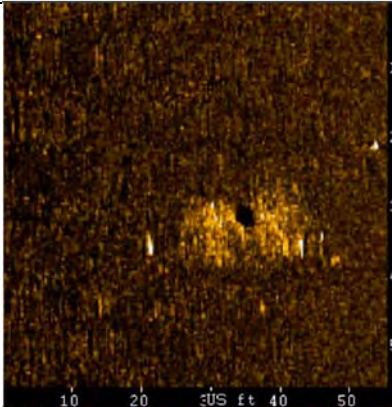
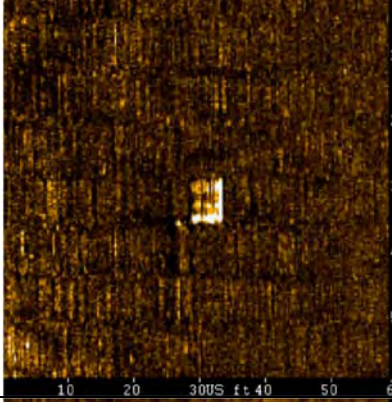
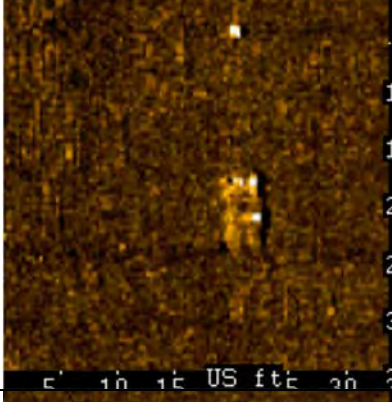
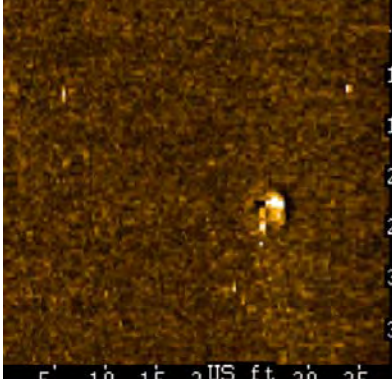
Contact Image	Contact Info	User Entered Info
	Target 056 <ul style="list-style-type: none"> Sonar Time at Target: 11/14/2011 09:57:27 Target Position (X) 972225.13 (Y) 649029.63 Map Projection: FL83-EF Range to Target: 49.50 US Feet Fish Height: 15.81 US Feet Heading: 190.500 degrees Line Name: 17_111114044400 	Dimensions Target Height: 0.00 US Feet Target Length: 194.45 US Feet Target Shadow: 0.00 US Feet Target Width: 289.34 US Feet Mag Anomaly: N/A Classification: Debris Field Area: ODMDS Description: Scattered miscellaneous pieces of small low relief debris.
	Target 057 <ul style="list-style-type: none"> Sonar Time at Target: 11/14/2011 10:02:57 Target Position (X) 972009.63 (Y) 647663.25 Map Projection: FL83-EF Range to Target: 27.08 US Feet Fish Height: 13.73 US Feet Heading: 190.200 degrees Line Name: 17_111114044400 	Dimensions Target Height: 0.00 US Feet Target Length: 14.85 US Feet Target Shadow: 0.00 US Feet Target Width: 36.80 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 058 <ul style="list-style-type: none"> Sonar Time at Target: 11/14/2011 10:05:14 Target Position (X) 972333.19 (Y) 647071.81 Map Projection: FL83-EF Range to Target: 74.25 US Feet Fish Height: 15.85 US Feet Heading: 190.900 degrees Line Name: 17_111114044400 	Dimensions Target Height: 0.00 US Feet Target Length: 155.03 US Feet Target Shadow: 0.00 US Feet Target Width: 432.39 US Feet Mag Anomaly: N/A Classification: Debris Field Area: ODMDS Description: Scattered miscellaneous pieces of small low relief pieces of debris.
	Target 059 <ul style="list-style-type: none"> Sonar Time at Target: 11/14/2011 10:29:55 Target Position (X) 969803.19 (Y) 645969.19 Map Projection: FL83-EF Range to Target: 95.44 US Feet Fish Height: 12.85 US Feet Heading: 1.000 degrees Line Name: 11_111114052900 	Dimensions Target Height: 1.23 US Feet Target Length: 18.66 US Feet Target Shadow: 9.41 US Feet Target Width: 20.17 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

Contact Image	Contact Info	User Entered Info
 A sonar image showing a dark, irregular shape on a light brown seabed. The shape is elongated and has some internal detail. A scale bar at the bottom indicates 50 US ft.	Target 060 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 10:37:28 • Target Position (X) 969819.63 (Y) 648795.00 • Map Projection: FL83-EF • Range to Target: 114.63 US Feet • Fish Height: 14.29 US Feet • Heading: 353.800 degrees • Line Name: 11_111114052900 	Dimensions Target Height: 0.00 US Feet Target Length: 112.79 US Feet Target Shadow: 0.00 US Feet Target Width: 19.11 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous three pieces of debris.
 A sonar image showing a dark, irregular shape on a light brown seabed. The shape is elongated and has some internal detail. A scale bar at the bottom indicates 60 US ft.	Target 061 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 10:47:34 • Target Position (X) 969823.19 (Y) 652365.19 • Map Projection: FL83-EF • Range to Target: 120.75 US Feet • Fish Height: 15.28 US Feet • Heading: 2.000 degrees • Line Name: 11_111114052900 	Dimensions Target Height: 0.00 US Feet Target Length: 16.35 US Feet Target Shadow: 0.00 US Feet Target Width: 14.78 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 A sonar image showing a dark, irregular shape on a light brown seabed. The shape is elongated and has some internal detail. A scale bar at the bottom indicates 30 US ft.	Target 062 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 11:06:28 • Target Position (X) 970416.63 (Y) 659048.13 • Map Projection: FL83-EF • Range to Target: 61.04 US Feet • Fish Height: 13.50 US Feet • Heading: 355.100 degrees • Line Name: 11_111114055900 	Dimensions Target Height: 0.64 US Feet Target Length: 18.48 US Feet Target Shadow: 2.93 US Feet Target Width: 13.60 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 A sonar image showing a dark, irregular shape on a light brown seabed. The shape is elongated and has some internal detail. A scale bar at the bottom indicates 25 US ft.	Target 063 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 11:06:31 • Target Position (X) 970359.69 (Y) 659066.88 • Map Projection: FL83-EF • Range to Target: 44.03 US Feet • Fish Height: 13.14 US Feet • Heading: 354.200 degrees • Line Name: 11_111114055900 	Dimensions Target Height: 1.36 US Feet Target Length: 6.12 US Feet Target Shadow: 4.70 US Feet Target Width: 7.75 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

Contact Image	Contact Info	User Entered Info
	Target 064 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 12:24:31 • Target Position (X) 971949.63 (Y) 650449.63 • Map Projection: FL83-EF • Range to Target: 47.66 US Feet • Fish Height: 10.62 US Feet • Heading: 194.800 degrees • Line Name: 16_111114071200 	Dimensions Target Height: 0.79 US Feet Target Length: 13.43 US Feet Target Shadow: 3.63 US Feet Target Width: 9.26 US Feet Mag Anomaly: 117 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 065 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 12:24:41 • Target Position (X) 972011.94 (Y) 650409.81 • Map Projection: FL83-EF • Range to Target: 66.14 US Feet • Fish Height: 11.48 US Feet • Heading: 194.900 degrees • Line Name: 16_111114071200 	Dimensions Target Height: 0.00 US Feet Target Length: 13.33 US Feet Target Shadow: 0.00 US Feet Target Width: 8.93 US Feet Mag Anomaly: 118 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 066 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 13:11:41 • Target Position (X) 969649.25 (Y) 650033.69 • Map Projection: FL83-EF • Range to Target: 80.89 US Feet • Fish Height: 11.83 US Feet • Heading: 351.900 degrees • Line Name: 10_111114075900 	Dimensions Target Height: 0.00 US Feet Target Length: 15.21 US Feet Target Shadow: 0.00 US Feet Target Width: 0.00 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 067 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 13:24:21 • Target Position (X) 969574.00 (Y) 654362.50 • Map Projection: FL83-EF • Range to Target: 100.80 US Feet • Fish Height: 10.66 US Feet • Heading: 352.100 degrees • Line Name: 10_111114075900 	Dimensions Target Height: 0.00 US Feet Target Length: 515.16 US Feet Target Shadow: 0.00 US Feet Target Width: 170.73 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: ODMDS Description: Area of high reflectivity.

Contact Image	Contact Info	User Entered Info
	Target 068 <ul style="list-style-type: none"> Sonar Time at Target: 11/14/2011 13:27:10 Target Position (X) 969543.06 (Y) 655354.63 Map Projection: FL83-EF Range to Target: 114.50 US Feet Fish Height: 11.52 US Feet Heading: 351.400 degrees Line Name: 10_111114075900 	Dimensions Target Height: 0.00 US Feet Target Length: 505.80 US Feet Target Shadow: 0.00 US Feet Target Width: 133.87 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: ODMDS Description: Area of high reflectivity.
	Target 069 <ul style="list-style-type: none"> Sonar Time at Target: 11/14/2011 13:28:24 Target Position (X) 969652.25 (Y) 655834.88 Map Projection: FL83-EF Range to Target: 85.33 US Feet Fish Height: 12.90 US Feet Heading: 349.400 degrees Line Name: 10_111114075900 	Dimensions Target Height: 0.00 US Feet Target Length: 342.26 US Feet Target Shadow: 0.00 US Feet Target Width: 108.64 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: ODMDS Description: Area of high reflectivity.
	Target 070 <ul style="list-style-type: none"> Sonar Time at Target: 11/14/2011 13:32:55 Target Position (X) 969698.63 (Y) 657430.63 Map Projection: FL83-EF Range to Target: 71.06 US Feet Fish Height: 13.71 US Feet Heading: 351.400 degrees Line Name: 10_111114082900 	Dimensions Target Height: 0.64 US Feet Target Length: 67.76 US Feet Target Shadow: 3.38 US Feet Target Width: 21.07 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 071 <ul style="list-style-type: none"> Sonar Time at Target: 11/14/2011 14:21:25 Target Position (X) 971633.88 (Y) 656770.00 Map Projection: FL83-EF Range to Target: 55.85 US Feet Fish Height: 16.77 US Feet Heading: 195.700 degrees Line Name: 15_111114090600 	Dimensions Target Height: 1.55 US Feet Target Length: 27.07 US Feet Target Shadow: 5.31 US Feet Target Width: 40.75 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

Contact Image	Contact Info	User Entered Info
 <p>5. 10 15 20 25 30 35 5' 10' 15' US ft 20' 30' 35'</p>	Target 072 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 14:36:50 • Target Position (X) 971248.00 (Y) 652629.81 • Map Projection: FL83-EF • Range to Target: 69.95 US Feet • Fish Height: 15.61 US Feet • Heading: 197.900 degrees • Line Name: 15_111114093600 	Dimensions Target Height: 0.00 US Feet Target Length: 14.17 US Feet Target Shadow: 0.00 US Feet Target Width: 24.39 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 <p>10 20 30 40 50 10' 20' US ft 40' 50'</p>	Target 073 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 03:02:05 • Target Position (X) 971148.06 (Y) 652198.19 • Map Projection: FL83-EF • Range to Target: 39.63 US Feet • Fish Height: 14.10 US Feet • Heading: 353.500 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.00 US Feet Target Length: 39.83 US Feet Target Shadow: 0.00 US Feet Target Width: 2.38 US Feet Mag Anomaly: 47 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 <p>10 20 30 40 50 10' 20' 30' US ft 40' 50'</p>	Target 074 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 03:03:17 • Target Position (X) 971170.63 (Y) 652674.06 • Map Projection: FL83-EF • Range to Target: 33.44 US Feet • Fish Height: 14.70 US Feet • Heading: 349.400 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.00 US Feet Target Length: 8.04 US Feet Target Shadow: 0.00 US Feet Target Width: 14.25 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 <p>10 20 30 40 50 10' 20' 30' US ft 40' 50'</p>	Target 075 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 14:51:03 • Target Position (X) 971559.19 (Y) 648615.63 • Map Projection: FL83-EF • Range to Target: 35.17 US Feet • Fish Height: 15.09 US Feet • Heading: 196.800 degrees • Line Name: 15_111114093600 	Dimensions Target Height: 1.71 US Feet Target Length: 15.11 US Feet Target Shadow: 4.14 US Feet Target Width: 4.68 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

Contact Image	Contact Info	User Entered Info
 A sonar image showing a bright, irregularly shaped object on a dark, textured seabed. The object is located in the upper right quadrant of the image. A scale bar at the bottom indicates 10, 20, 30, 40, and 50 US feet. A vertical depth scale on the right side ranges from 10 to 50 feet.	Target 076 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 02:46:18 • Target Position (X) 971067.06 (Y) 646066.94 • Map Projection: FL83-EF • Range to Target: 58.62 US Feet • Fish Height: 9.15 US Feet • Heading: 343.600 degrees • Line Name: 14_111113214500 	Dimensions Target Height: 0.00 US Feet Target Length: 31.63 US Feet Target Shadow: 0.00 US Feet Target Width: 57.49 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: ODMDS Description: Area of high reflectivity.
 A sonar image showing a bright, rectangular object on a dark, textured seabed. The object is located in the center of the image. A scale bar at the bottom indicates 10, 20, 30, 40, and 50 US feet. A vertical depth scale on the right side ranges from 10 to 60 feet.	Target 077 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 13:32:34 • Target Position (X) 969569.94 (Y) 657320.75 • Map Projection: FL83-EF • Range to Target: 107.06 US Feet • Fish Height: 13.49 US Feet • Heading: 347.200 degrees • Line Name: 10_111114082900 	Dimensions Target Height: 0.00 US Feet Target Length: 24.69 US Feet Target Shadow: 0.00 US Feet Target Width: 14.76 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 A sonar image showing a bright, rectangular object on a dark, textured seabed. The object is located in the center of the image. A scale bar at the bottom indicates 10, 20, 30, 40, and 50 US feet. A vertical depth scale on the right side ranges from 10 to 30 feet.	Target 078 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 13:33:12 • Target Position (X) 969733.63 (Y) 657515.88 • Map Projection: FL83-EF • Range to Target: 62.39 US Feet • Fish Height: 14.64 US Feet • Heading: 348.400 degrees • Line Name: 10_111114082900 	Dimensions Target Height: 0.00 US Feet Target Length: 16.84 US Feet Target Shadow: 0.00 US Feet Target Width: 8.98 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
 A sonar image showing a bright, rectangular object on a dark, textured seabed. The object is located in the center of the image. A scale bar at the bottom indicates 10, 20, 30, 40, and 50 US feet. A vertical depth scale on the right side ranges from 10 to 30 feet.	Target 079 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 13:33:28 • Target Position (X) 969854.94 (Y) 657594.13 • Map Projection: FL83-EF • Range to Target: 27.86 US Feet • Fish Height: 14.28 US Feet • Heading: 346.800 degrees • Line Name: 10_111114082900 	Dimensions Target Height: 0.85 US Feet Target Length: 13.50 US Feet Target Shadow: 1.69 US Feet Target Width: 7.30 US Feet Mag Anomaly: 128 Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

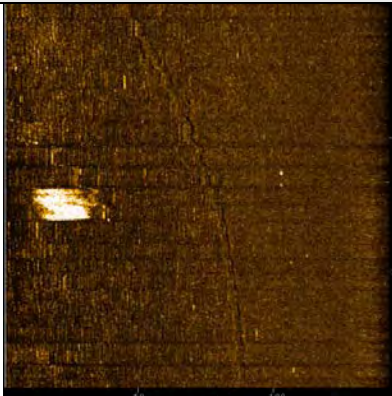
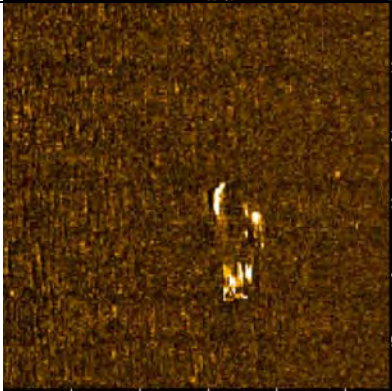
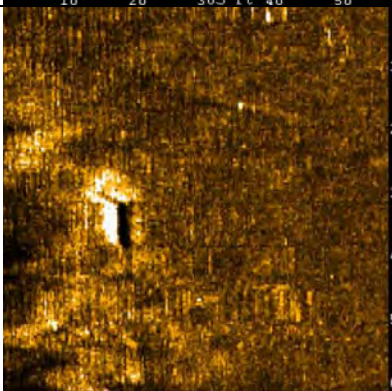
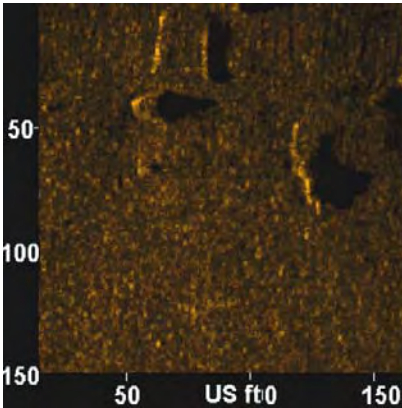
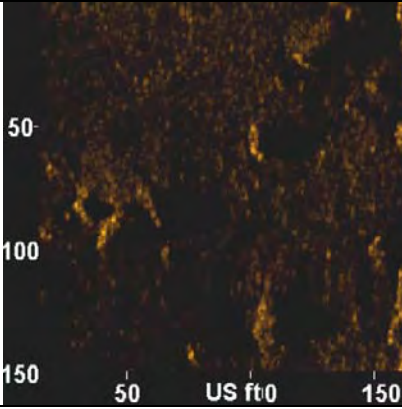
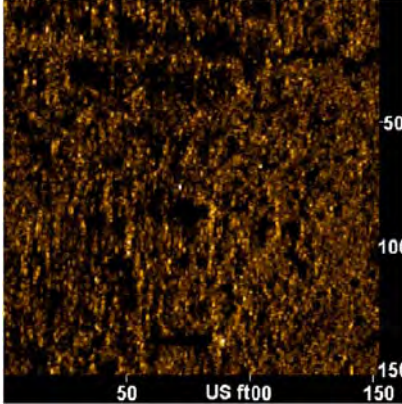
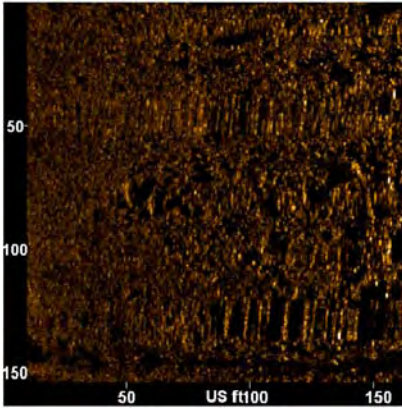
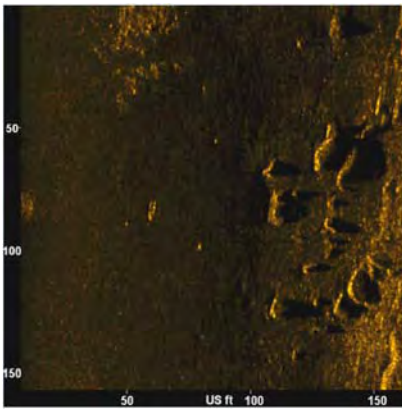
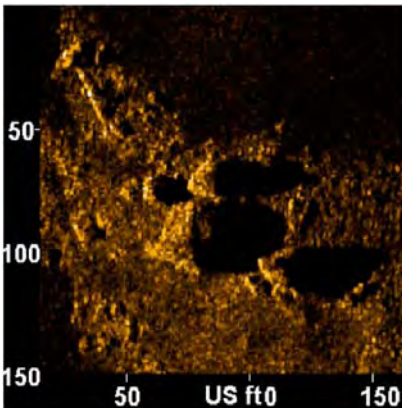
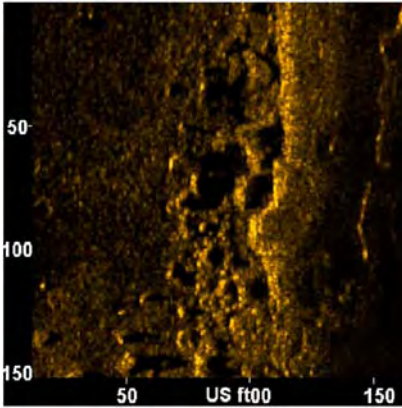
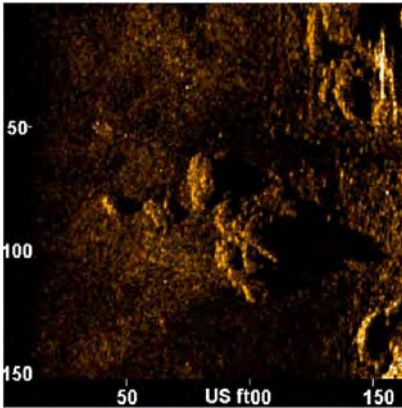
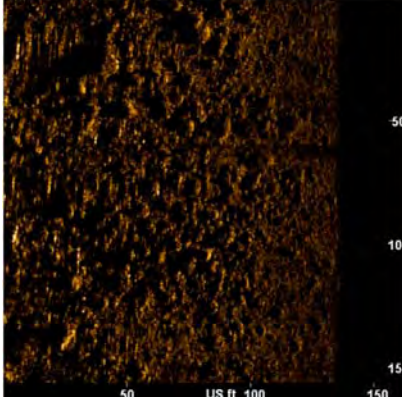
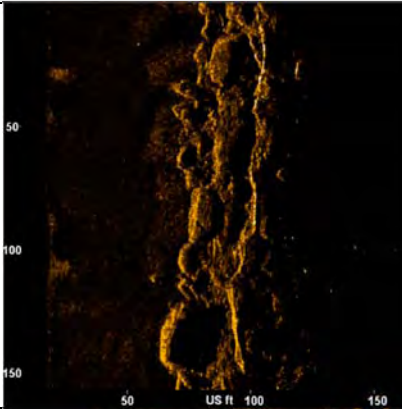
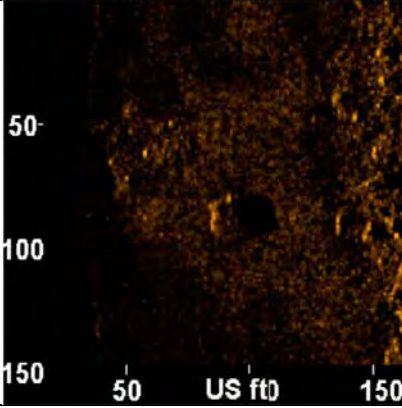
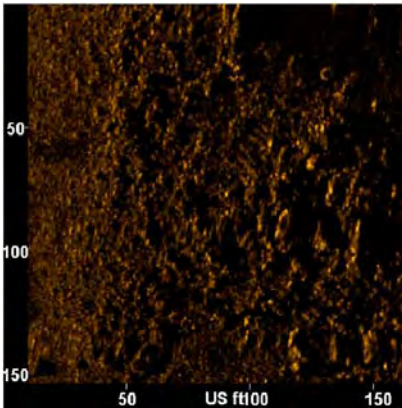
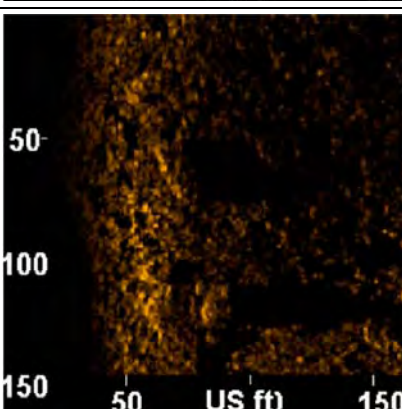
Contact Image	Contact Info	User Entered Info
	Target 080 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 13:36:29 • Target Position (X) 969497.44 (Y) 658656.13 • Map Projection: FL83-EF • Range to Target: 128.52 US Feet • Fish Height: 13.70 US Feet • Heading: 348.200 degrees • Line Name: 10_111114082900 	Dimensions Target Height: 0.00 US Feet Target Length: 35.26 US Feet Target Shadow: 0.00 US Feet Target Width: 60.11 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: ODMDS Description: Area of high reflectivity.
	Target 081 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 13:19:40 • Target Position (X) 969762.81 (Y) 652733.63 • Map Projection: FL83-EF • Range to Target: 49.28 US Feet • Fish Height: 12.86 US Feet • Heading: 352.300 degrees • Line Name: 10_111114075900 	Dimensions Target Height: 0.00 US Feet Target Length: 49.13 US Feet Target Shadow: 0.00 US Feet Target Width: 18.93 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.
	Target 082 <ul style="list-style-type: none"> • Sonar Time at Target: 11/14/2011 13:10:17 • Target Position (X) 969635.25 (Y) 649551.25 • Map Projection: FL83-EF • Range to Target: 90.37 US Feet • Fish Height: 14.18 US Feet • Heading: 347.500 degrees • Line Name: 10_111114075900 	Dimensions Target Height: 0.00 US Feet Target Length: 22.11 US Feet Target Shadow: 0.00 US Feet Target Width: 5.42 US Feet Mag Anomaly: N/A Classification: Debris Area: ODMDS Description: Miscellaneous piece of debris.

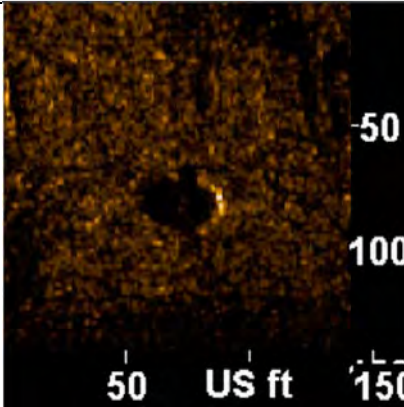
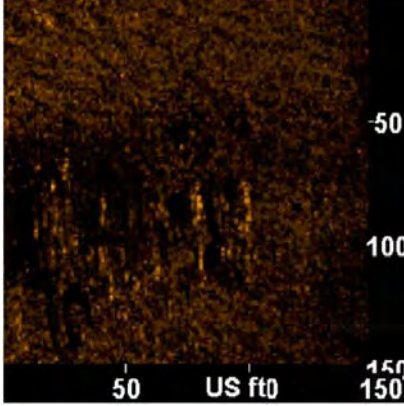
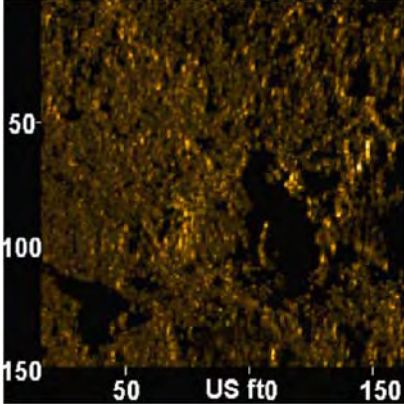
Table 4-06. Channel Sidescan Sonar Target Images.

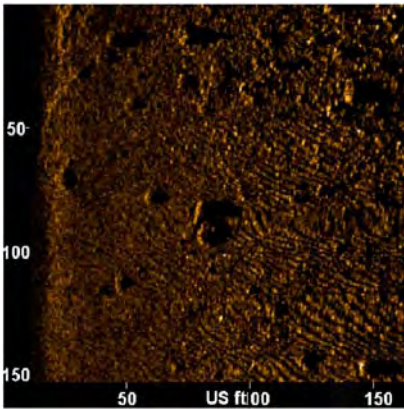
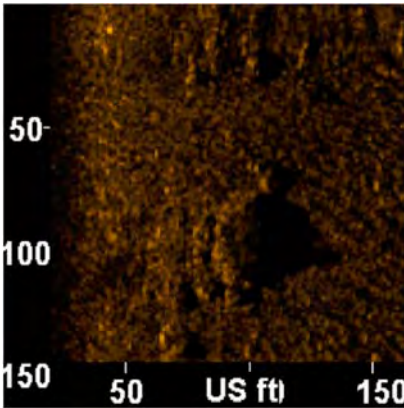
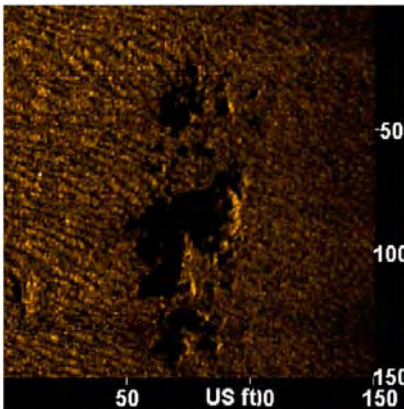
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	Contact 083 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:04:02 • Target Position (X) 952139.56 (Y) 640454.19 • Map Projection: FL83-EF • Range to Target: 31.65 US Feet • Fish Height: 4.61 US Feet • Heading: 101.600 degrees • Line Name: 03_111111110300 	Dimensions Target Height: 0.00 US Feet Target Length: 24.01 US Feet Target Shadow: 0.00 US Feet Target Width: 25.78 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Three pieces of miscellaneous medium relief debris.
	Contact 084 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:04:23 • Target Position (X) 952263.50 (Y) 640452.75 • Map Projection: FL83-EF • Range to Target: 34.30 US Feet • Fish Height: 3.93 US Feet • Heading: 95.500 degrees • Line Name: 03_111111110300 	Dimensions Target Height: 0.00 US Feet Target Length: 34.29 US Feet Target Shadow: 0.00 US Feet Target Width: 27.98 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous pieces of medium relief debris
	Contact 085 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:08:09 • Target Position (X) 952273.19 (Y) 640768.56 • Map Projection: FL83-EF • Range to Target: 27.24 US Feet • Fish Height: 4.69 US Feet • Heading: 264.800 degrees • Line Name: 06_111111115500 	Dimensions Target Height: 0.00 US Feet Target Length: 26.74 US Feet Target Shadow: 0.00 US Feet Target Width: 32.64 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris.

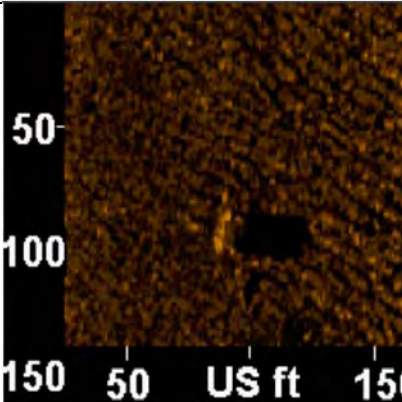
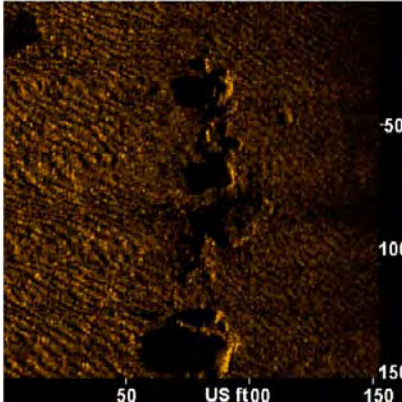
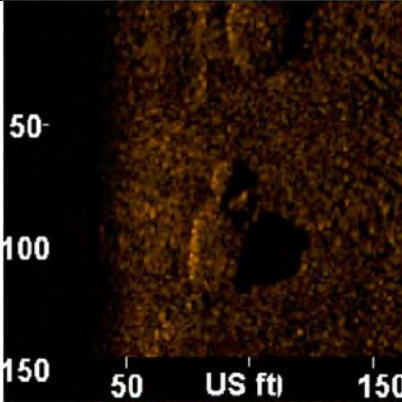
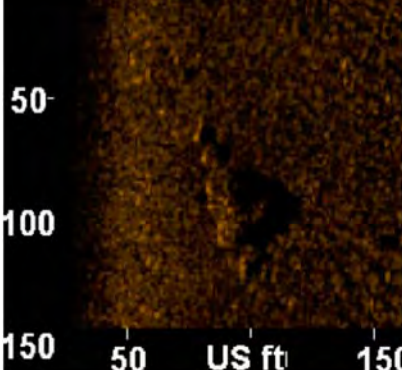
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	Contact 086 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 18:22:38 • Target Position (X) 952297.44 (Y) 640663.81 • Map Projection: FL83-EF • Range to Target: 29.21 US Feet • Fish Height: 5.18 US Feet • Heading: 99.200 degrees • Line Name: 05_111111132100 	Dimensions Target Height: 0.00 US Feet Target Length: 90.23 US Feet Target Shadow: 0.00 US Feet Target Width: 70.88 US Feet Mag Anomaly: 41, 42 Classification: Small Debris Field Area: Channel Description: Small area of scattered miscellaneous low relief pieces of debris.
	Contact 087 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:04:37 • Target Position (X) 952337.50 (Y) 640454.94 • Map Projection: FL83-EF • Ping Number: 2639 • Range to Target: 35.65 US Feet • Fish Height: 5.39 US Feet • Heading: 108.200 degrees • Line Name: 03_111111110300 	Dimensions Target Height: 0.00 US Feet Target Length: 61.06 US Feet Target Shadow: 0.00 US Feet Target Width: 30.36 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of medium relief debris.
	Contact 088 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:34:33 • Target Position (X) 952341.19 (Y) 641022.31 • Map Projection: FL83-EF • Range to Target: 16.49 US Feet • Fish Height: 5.83 US Feet • Heading: 265.000 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 20.61 US Feet Target Shadow: 0.00 US Feet Target Width: 38.44 US Feet Mag Anomaly: 28, 29 Classification: Debris Area: Channel Description: Miscellaneous three pieces of high relief debris, about 4 feet tall each.

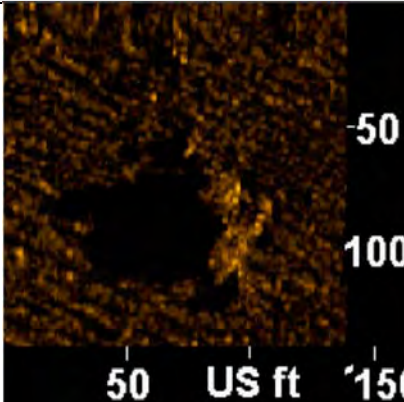
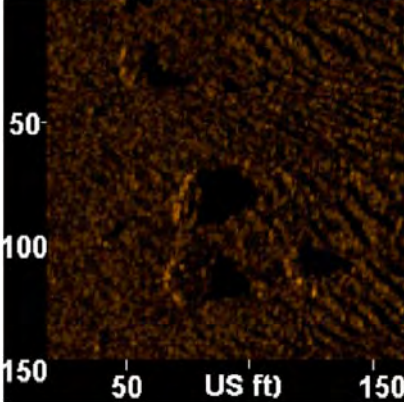
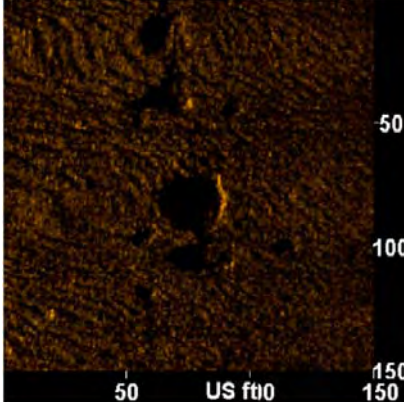
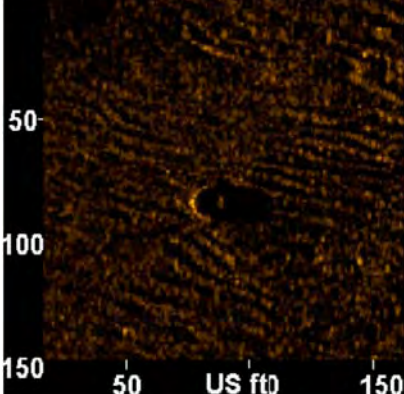
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	Contact 089 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:04:56 • Target Position (X) 952436.06 (Y) 640450.69 • Map Projection: FL83-EF • Range to Target: 36.68 US Feet • Fish Height: 4.99 US Feet • Heading: 107.500 degrees • Line Name: 03_111111110300 	Dimensions Target Height: 0.00 US Feet Target Length: 54.08 US Feet Target Shadow: 0.00 US Feet Target Width: 11.85 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris.
	Contact 090 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:33:31 • Target Position (X) 952771.56 (Y) 641040.38 • Map Projection: FL83-EF • Range to Target: 20.18 US Feet • Fish Height: 5.51 US Feet • Heading: 263.000 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 33.21 US Feet Target Shadow: 0.00 US Feet Target Width: 37.28 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of medium to high relief debris, ranging from 2 to 5 feet in height.
	Contact 091 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:40:21 • Target Position (X) 952801.88 (Y) 640744.19 • Map Projection: FL83-EF • Range to Target: 22.45 US Feet • Fish Height: 6.05 US Feet • Heading: 108.300 degrees • Line Name: 04_111111113800 	Dimensions Target Height: 0.00 US Feet Target Length: 1200.00 US Feet Target Shadow: 0.00 US Feet Target Width: 300.00 US Feet Mag Anomaly: 115 Classification: Large Debris Field Area: Channel Description: Large area of miscellaneous scattered debris.

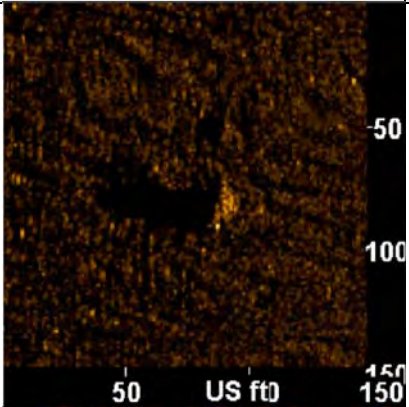
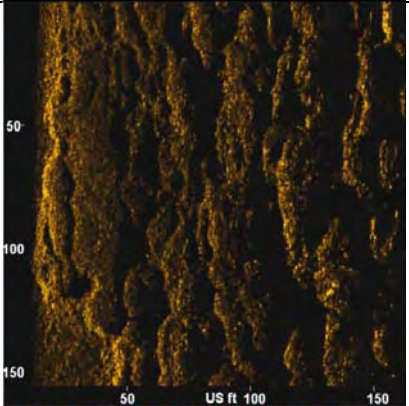
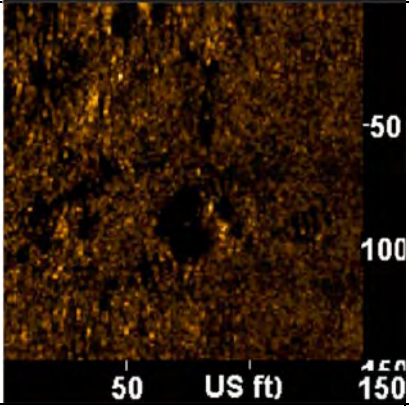
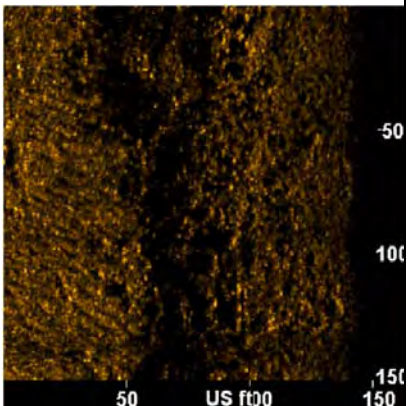
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	Contact 092 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:33:04 • Target Position (X) 952951.88 (Y) 641072.00 • Map Projection: FL83-EF • Range to Target: 29.50 US Feet • Fish Height: 5.17 US Feet • Heading: 264.200 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 200.00 US Feet Target Shadow: 0.00 US Feet Target Width: 40.00 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: Channel Description: Apparent mound.
	Contact 093 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:32:36 • Target Position (X) 953156.50 (Y) 641017.94 • Map Projection: FL83-EF • Range to Target: 11.82 US Feet • Fish Height: 4.84 US Feet • Heading: 262.800 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 2.18 US Feet Target Length: 7.36 US Feet Target Shadow: 6.18 US Feet Target Width: 4.52 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 094 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:07:12 • Target Position (X) 953206.81 (Y) 640477.19 • Map Projection: FL83-EF • Range to Target: 33.21 US Feet • Fish Height: 5.88 US Feet • Heading: 104.900 degrees • Line Name: 03_111111110300 	Dimensions Target Height: 0.00 US Feet Target Length: 50.00 US Feet Target Shadow: 0.00 US Feet Target Width: 50.00 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris.
	Contact 095 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:37:52 • Target Position (X) 953256.69 (Y) 641103.56 • Map Projection: FL83-EF • Range to Target: 9.47 US Feet • Fish Height: 4.80 US Feet • Heading: 265.500 degrees • Line Name: 08_1111111122700 	Dimensions Target Height: 0.00 US Feet Target Length: 20.96 US Feet Target Shadow: 0.00 US Feet Target Width: 11.84 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous two pieces of high relief debris, ranging from 4 to 6 feet in height.

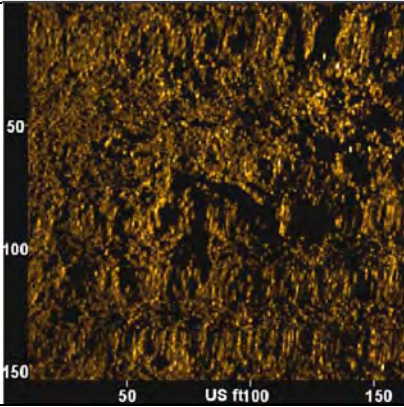
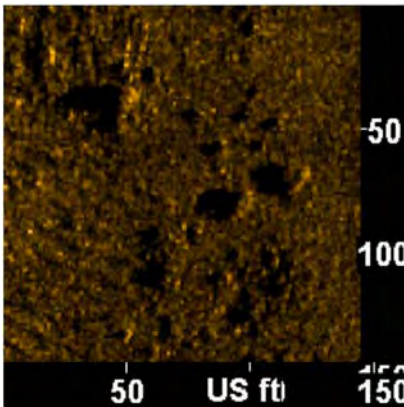
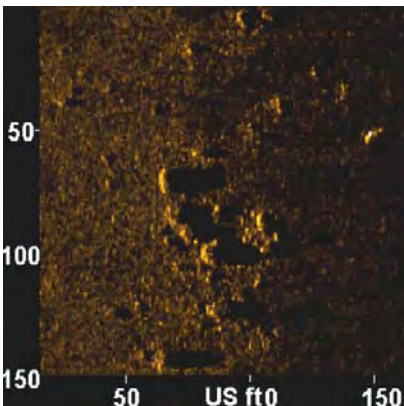
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	Contact 096 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:37:46 • Target Position (X) 953286.75 (Y) 640973.31 • Map Projection: FL83-EF • Range to Target: 31.72 US Feet • Fish Height: 2.81 US Feet • Heading: 263.900 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 0.23 US Feet Target Length: 6.47 US Feet Target Shadow: 2.68 US Feet Target Width: 5.36 US Feet Mag Anomaly: 27 Classification: Debris Area: Channel Description: Miscellaneous piece of debris, possibly a tire.
	Contact 097 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:37:41 • Target Position (X) 953314.56 (Y) 641014.13 • Map Projection: FL83-EF • Ping Number: 85169 • Range to Target: 19.79 US Feet • Fish Height: 3.43 US Feet • Heading: 265.600 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 0.41 US Feet Target Length: 7.35 US Feet Target Shadow: 2.45 US Feet Target Width: 4.90 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 098 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 18:25:12 • Target Position (X) 953352.06 (Y) 640678.81 • Map Projection: FL83-EF • Range to Target: 29.93 US Feet • Fish Height: 4.69 US Feet • Heading: 96.400 degrees • Line Name: 05_111111132100 	Dimensions Target Height: 0.00 US Feet Target Length: 27.09 US Feet Target Shadow: 0.00 US Feet Target Width: 28.01 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous two pieces of medium relief debris, about 1 foot in height.

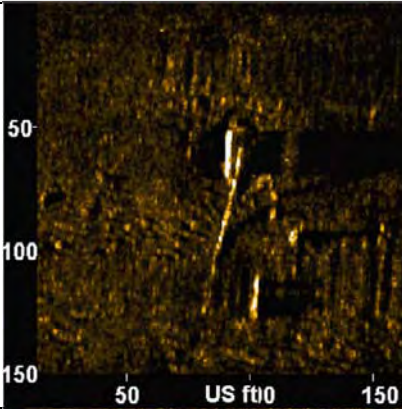
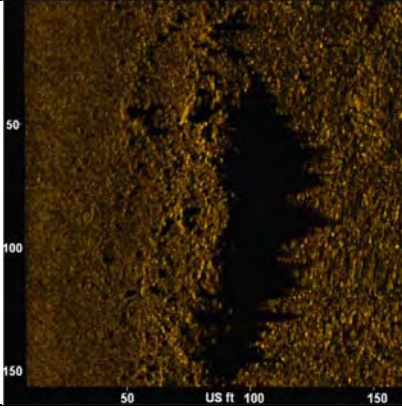
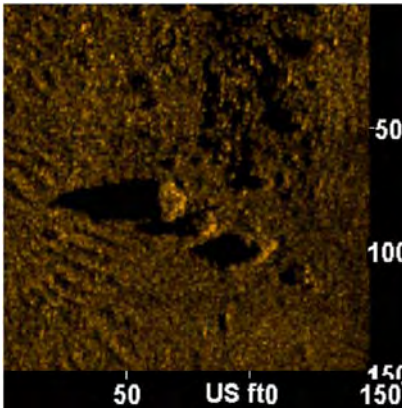
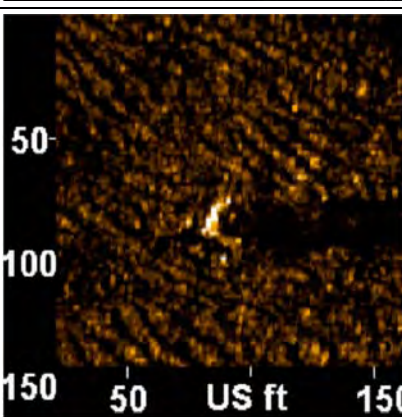
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	<p>Contact 099</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:14:10 • Target Position (X) 953396.81 (Y) 640406.56 • Map Projection: FL83-EF • Range to Target: 20.09 US Feet • Fish Height: 4.64 US Feet • Heading: 103.400 degrees • Line Name: 02_111111121300 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 60.07 US Feet Target Shadow: 0.00 US Feet Target Width: 43.60 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris, all 1.5 feet or less in height.</p>
	<p>Contact 100</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:07:48 • Target Position (X) 953419.94 (Y) 640537.19 • Map Projection: FL83-EF • Range to Target: 12.24 US Feet • Fish Height: 5.00 US Feet • Heading: 103.000 degrees • Line Name: 03_111111110300 	<p>Dimensions</p> <p>Target Height: 2.57 US Feet Target Length: 11.94 US Feet Target Shadow: 7.48 US Feet Target Width: 5.98 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Block: Description: Miscellaneous piece of debris.</p>
	<p>Contact 101</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:14:16 • Target Position (X) 953435.00 (Y) 640530.13 • Map Projection: FL83-EF • Range to Target: 18.06 US Feet • Fish Height: 4.42 US Feet • Heading: 101.300 degrees • Line Name: 02_111111121300 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 54.23 US Feet Target Shadow: 0.00 US Feet Target Width: 15.32 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of medium relief debris, ranging from 1 to 3 feet in height.</p>

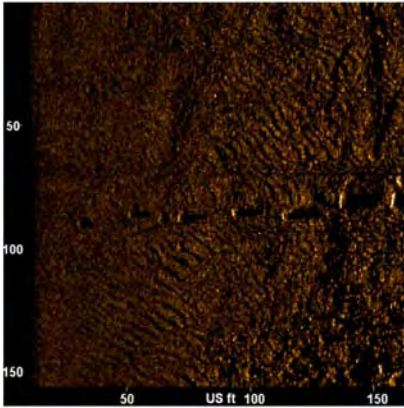
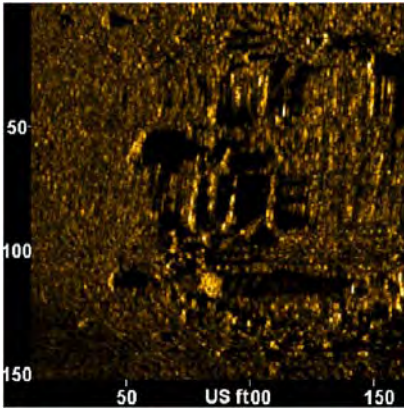
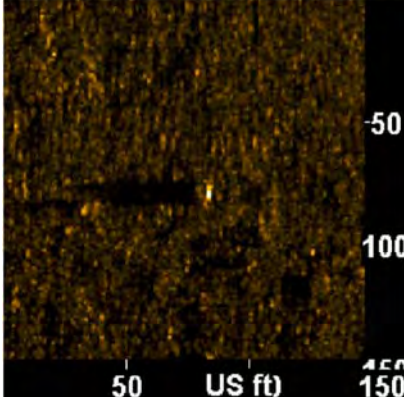
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	Contact 102 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:14:22 • Target Position (X) 953481.69 (Y) 640434.69 • Map Projection: FL83-EF • Range to Target: 13.00 US Feet • Fish Height: 4.63 US Feet • Heading: 103.000 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 2.31 US Feet Target Length: 4.94 US Feet Target Shadow: 7.66 US Feet Target Width: 2.96 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 103 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:14:30 • Target Position (X) 953544.06 (Y) 640540.19 • Map Projection: FL83-EF • Range to Target: 20.41 US Feet • Fish Height: 4.81 US Feet • Heading: 108.300 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 0.00 US Feet Target Length: 77.31 US Feet Target Shadow: 0.00 US Feet Target Width: 22.53 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to three feet in height.
	Contact 104 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:08:10 • Target Position (X) 953564.38 (Y) 640539.81 • Map Projection: FL83-EF • Range to Target: 10.50 US Feet • Fish Height: 5.00 US Feet • Heading: 105.100 degrees • Line Name: 03_111111110300 	Dimensions Target Height: 3.39 US Feet Target Length: 10.97 US Feet Target Shadow: 8.96 US Feet Target Width: 6.95 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 105 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:08:26 • Target Position (X) 953671.06 (Y) 640541.19 • Map Projection: FL83-EF • Range to Target: 10.56 US Feet • Fish Height: 4.54 US Feet • Heading: 94.100 degrees • Line Name: 03_111111110300 	Dimensions Target Height: 2.06 US Feet Target Length: 8.47 US Feet Target Shadow: 5.57 US Feet Target Width: 4.01 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.

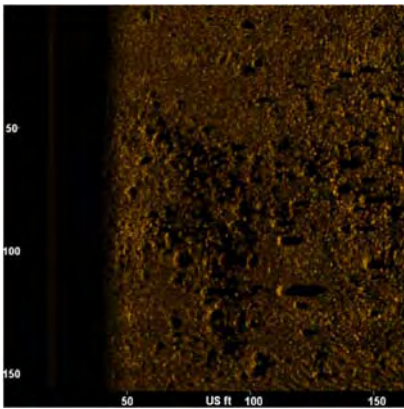
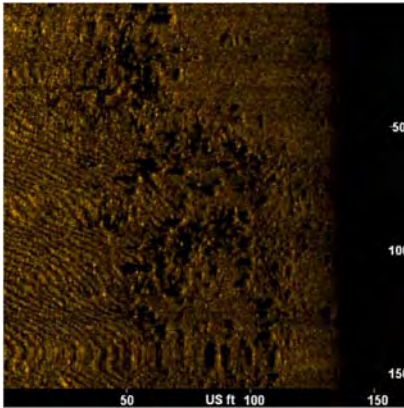
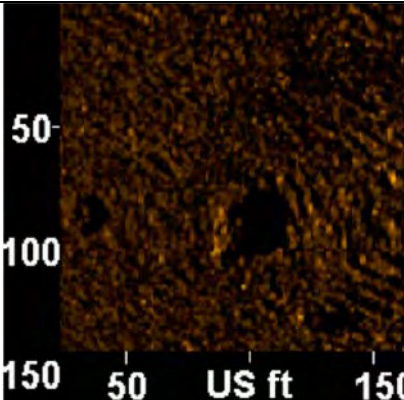
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	Contact 106 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:14:51 • Target Position (X) 953692.19 (Y) 640536.25 • Map Projection: FL83-EF • Range to Target: 20.99 US Feet • Fish Height: 3.82 US Feet • Heading: 100.600 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 2.29 US Feet Target Length: 10.85 US Feet Target Shadow: 15.44 US Feet Target Width: 6.52 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 107 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:08:50 • Target Position (X) 953827.31 (Y) 640527.81 • Map Projection: FL83-EF • Range to Target: 17.31 US Feet • Fish Height: 4.46 US Feet • Heading: 97.800 degrees • Line Name: 03_11111110300 	Dimensions Target Height: 0.00 US Feet Target Length: 16.60 US Feet Target Shadow: 0.00 US Feet Target Width: 19.43 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous three pieces of medium relief debris, all about 1 foot in height.
	Contact 108 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:15:13 • Target Position (X) 953840.81 (Y) 640535.44 • Map Projection: FL83-EF • Range to Target: 18.39 US Feet • Fish Height: 4.21 US Feet • Heading: 98.100 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 0.00 US Feet Target Length: 48.62 US Feet Target Shadow: 0.00 US Feet Target Width: 14.45 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of medium relief debris, 1 to 2 feet in height.
	Contact 109 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:03:57 • Target Position (X) 953843.19 (Y) 640975.75 • Map Projection: FL83-EF • Range to Target: 27.73 US Feet • Fish Height: 4.79 US Feet • Heading: 260.600 degrees • Line Name: 06_111111115500 	Dimensions Target Height: 1.06 US Feet Target Length: 4.67 US Feet Target Shadow: 6.59 US Feet Target Width: 4.89 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris, possibly a tire.

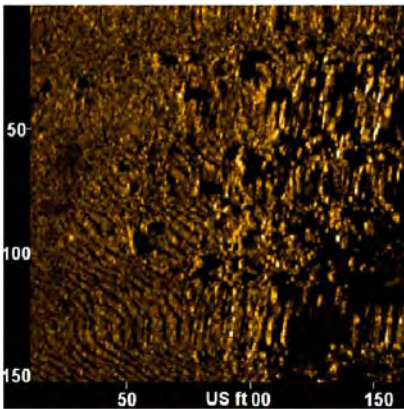
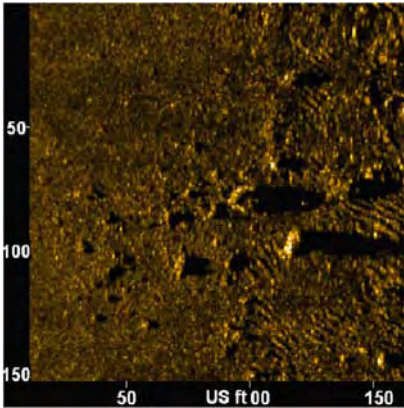
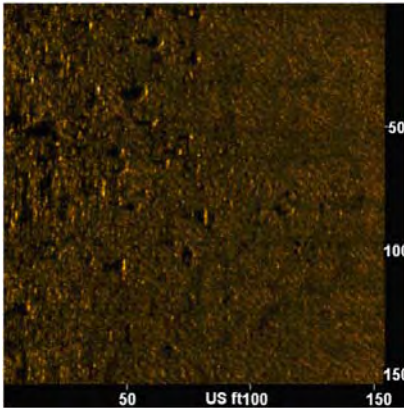
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	Contact 111 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:16:05 • Target Position (X) 954207.44 (Y) 640401.75 • Map Projection: FL83-EF • Range to Target: 28.91 US Feet • Fish Height: 5.07 US Feet • Heading: 106.000 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 0.00 US Feet Target Length: 150.00 US Feet Target Shadow: 0.00 US Feet Target Width: 150.00 US Feet Mag Anomaly: N/A Avoidance Area: Classification: Seafloor Feature Area: Channel Description: Possible Rock
	Contact 112 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:35:11 • Target Position (X) 954283.19 (Y) 641012.31 • Map Projection: FL83-EF • Range to Target: 21.71 US Feet • Fish Height: 5.66 US Feet • Heading: 261.200 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 1.47 US Feet Target Length: 6.11 US Feet Target Shadow: 6.12 US Feet Target Width: 3.85 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 113 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:16:30 • Target Position (X) 954389.81 (Y) 640541.75 • Map Projection: FL83-EF • Ping Number: 66382 • Range to Target: 15.43 US Feet • Fish Height: 5.08 US Feet • Heading: 101.700 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 0.00 US Feet Target Length: 50.00 US Feet Target Shadow: 0.00 US Feet Target Width: 20.00 US Feet Mag Anomaly: 74, 113 Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris.

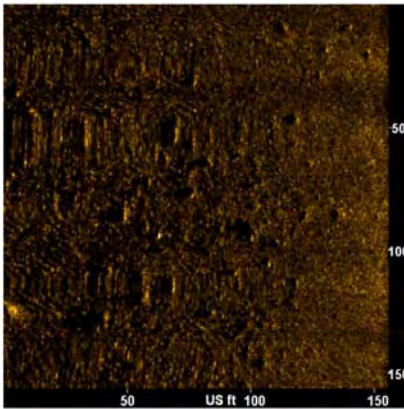
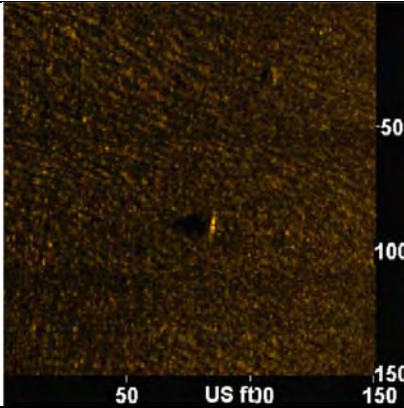
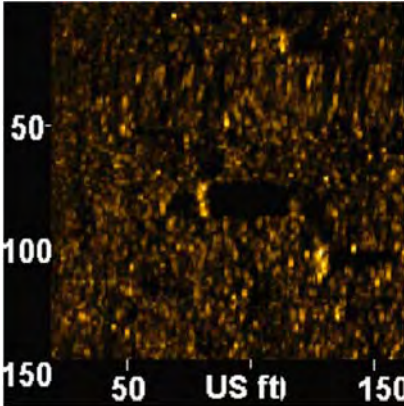
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	Contact 114 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 18:28:22 • Target Position (X) 954593.81 (Y) 640697.44 • Map Projection: FL83-EF • Range to Target: 31.28 US Feet • Fish Height: 4.79 US Feet • Heading: 100.400 degrees • Line Name: 05_111111132100 	Dimensions Target Height: 0.26 US Feet Target Length: 13.19 US Feet Target Shadow: 1.76 US Feet Target Width: 8.82 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 115 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:17:08 • Target Position (X) 954647.69 (Y) 640533.88 • Map Projection: FL83-EF • Range to Target: 12.82 US Feet • Fish Height: 4.88 US Feet • Heading: 102.100 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 0.00 US Feet Target Length: 34.16 US Feet Target Shadow: 0.00 US Feet Target Width: 27.34 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, less than 1 foot in height.
	Contact 116 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:29:11 • Target Position (X) 954657.50 (Y) 641065.56 • Map Projection: FL83-EF • Range to Target: 21.36 US Feet • Fish Height: 4.88 US Feet • Heading: 262.900 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 61.87 US Feet Target Shadow: 0.00 US Feet Target Width: 32.54 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2 feet in height.

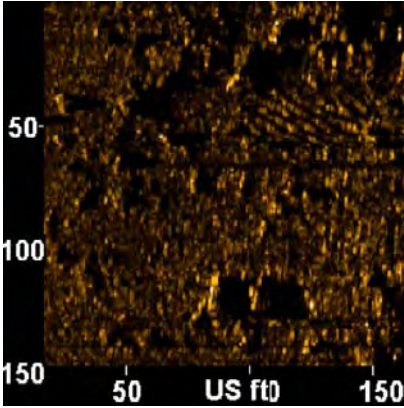
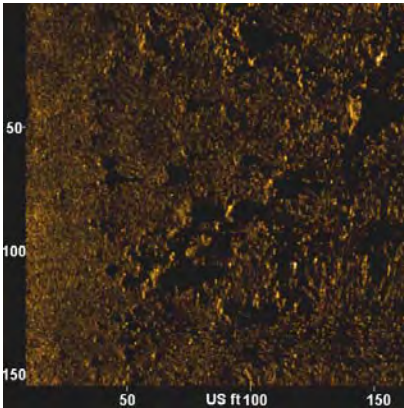
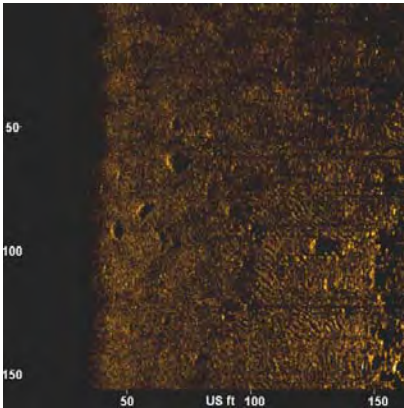
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	Contact 117 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:34:06 • Target Position (X) 954701.63 (Y) 641214.44 • Map Projection: FL83-EF • Range to Target: 39.08 US Feet • Fish Height: 4.81 US Feet • Heading: 265.800 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 0.19 US Feet Target Length: 23.83 US Feet Target Shadow: 1.54 US Feet Target Width: 3.29 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous two pieces of linear debris
	Contact 118 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:11:14 • Target Position (X) 954718.44 (Y) 640519.19 • Map Projection: FL83-EF • Range to Target: 23.30 US Feet • Fish Height: 4.53 US Feet • Heading: 98.400 degrees • Line Name: 03_111111110300 	Dimensions Target Height: 4.14 US Feet Target Length: 79.37 US Feet Target Shadow: 29.48 US Feet Target Width: 10.24 US Feet Mag Anomaly: 62 Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 119 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:17:29 • Target Position (X) 954791.50 (Y) 640542.94 • Map Projection: FL83-EF • Range to Target: 14.77 US Feet • Fish Height: 5.28 US Feet • Heading: 101.300 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 0.00 US Feet Target Length: 7.21 US Feet Target Shadow: 0.00 US Feet Target Width: 17.43 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous three pieces of medium relief debris, ranging from 2 to 3 feet in height.
	Contact 120 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:17:45 • Target Position (X) 954906.94 (Y) 640379.31 • Map Projection: FL83-EF • Ping Number: 67489 • Range to Target: 37.44 US Feet • Fish Height: 4.75 US Feet • Heading: 105.700 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 0.72 US Feet Target Length: 5.51 US Feet Target Shadow: 5.97 US Feet Target Width: 3.45 US Feet Mag Anomaly: 98, 99 Classification: Debris Area: Channel Description: Miscellaneous piece of debris.

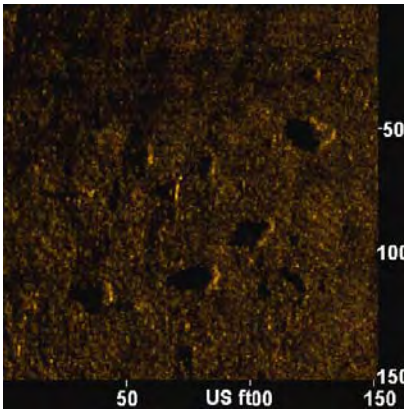
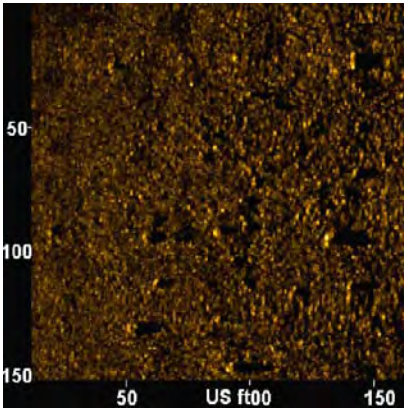
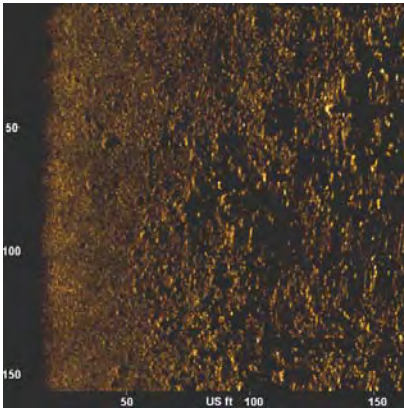
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	Contact 121 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 18:29:15 • Target Position (X) 954943.00 (Y) 640718.50 • Map Projection: FL83-EF • Range to Target: 27.19 US Feet • Fish Height: 5.08 US Feet • Heading: 103.000 degrees • Line Name: 05_111111132100 	Dimensions Target Height: 0.00 US Feet Target Length: 650.00 US Feet Target Shadow: 0.00 US Feet Target Width: 4.00 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Unusual linear feature going across the whole site, objects usually a foot or less in height.
	Contact 122 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 18:00:40 • Target Position (X) 955367.56 (Y) 641302.19 • Map Projection: FL83-EF • Range to Target: 35.39 US Feet • Fish Height: 5.76 US Feet • Heading: 267.000 degrees • Line Name: 09_111111125600 	Dimensions Target Height: 0.00 US Feet Target Length: 45.20 US Feet Target Shadow: 0.00 US Feet Target Width: 32.05 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from less than 1 foot to 2 feet high.
	Contact 123 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:32:32 • Target Position (X) 955389.00 (Y) 640995.94 • Map Projection: FL83-EF • Range to Target: 35.27 US Feet • Fish Height: 3.98 US Feet • Heading: 262.800 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 1.41 US Feet Target Length: 4.19 US Feet Target Shadow: 13.98 US Feet Target Width: 2.81 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.

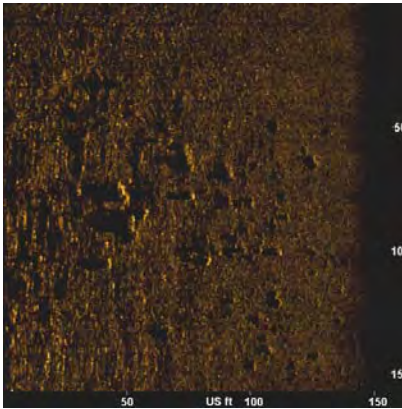
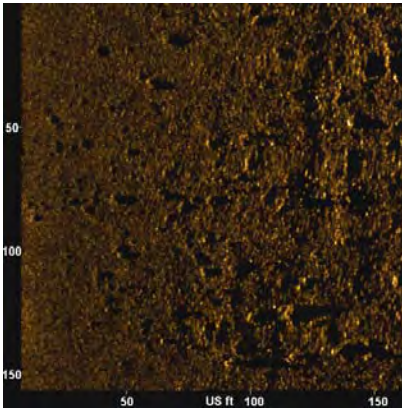
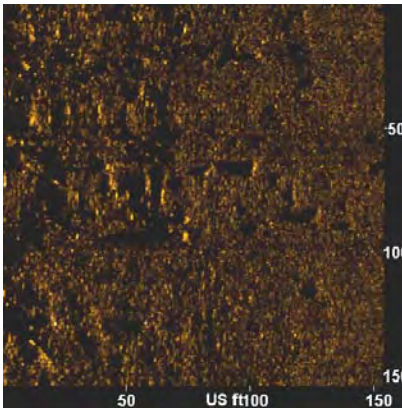
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	<p>Contact 124</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:13:20 • Target Position (X) 955448.25 (Y) 640554.88 • Map Projection: FL83-EF • Range to Target: 15.54 US Feet • Fish Height: 4.82 US Feet • Heading: 98.900 degrees • Line Name: 03_11111110300 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 60.87 US Feet Target Shadow: 0.00 US Feet Target Width: 70.09 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris, less than one foot in height.</p>
	<p>Contact 125</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:19:06 • Target Position (X) 955448.38 (Y) 640583.31 • Map Projection: FL83-EF • Range to Target: 19.83 US Feet • Fish Height: 6.67 US Feet • Heading: 105.300 degrees • Line Name: 02_111111121300 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 101.91 US Feet Target Shadow: 0.00 US Feet Target Width: 44.41 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris, less than one foot in height.</p>
	<p>Contact 126</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:32:20 • Target Position (X) 955468.94 (Y) 641168.75 • Map Projection: FL83-EF • Range to Target: 17.66 US Feet • Fish Height: 4.75 US Feet • Heading: 263.100 degrees • Line Name: 08_111111122700 	<p>Dimensions</p> <p>Target Height: 1.58 US Feet Target Length: 6.77 US Feet Target Shadow: 6.54 US Feet Target Width: 3.51 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.</p>

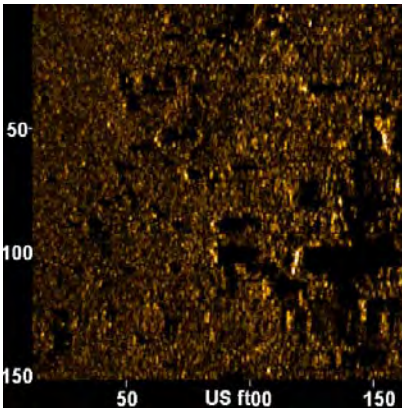
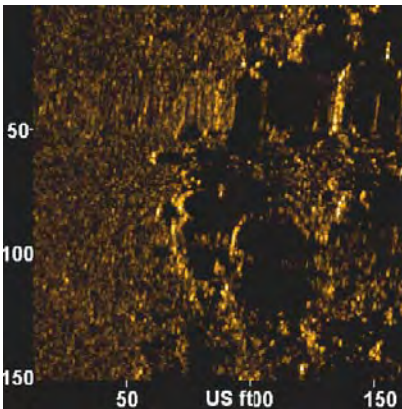
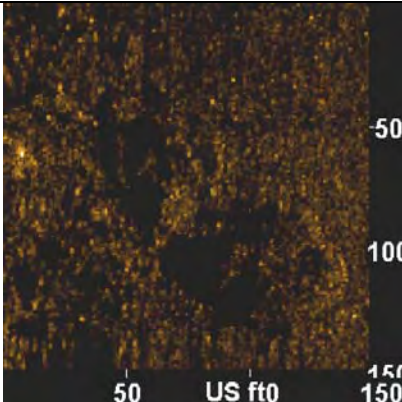
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	Contact 127 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:19:12 • Target Position (X) 955479.75 (Y) 640392.19 • Map Projection: FL83-EF • Ping Number: 68779 • Range to Target: 39.66 US Feet • Fish Height: 6.54 US Feet • Heading: 108.300 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 0.00 US Feet Target Length: 60.42 US Feet Target Shadow: 0.00 US Feet Target Width: 51.56 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris, less than one foot in height.
	Contact 128 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:59:56 • Target Position (X) 955663.75 (Y) 641297.31 • Map Projection: FL83-EF • Range to Target: 28.74 US Feet • Fish Height: 5.18 US Feet • Heading: 261.900 degrees • Line Name: 09_111111125600 	Dimensions Target Height: 0.00 US Feet Target Length: 27.92 US Feet Target Shadow: 0.00 US Feet Target Width: 65.53 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to high relief debris, ranging from less than a foot to three feet in height.
	Contact 129 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:27:01 • Target Position (X) 955727.50 (Y) 640919.38 • Map Projection: FL83-EF • Range to Target: 29.75 US Feet • Fish Height: 5.67 US Feet • Heading: 265.400 degrees • Line Name: 07_11111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 100.00 US Feet Target Shadow: 0.00 US Feet Target Width: 60.00 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris, less than one foot in height.

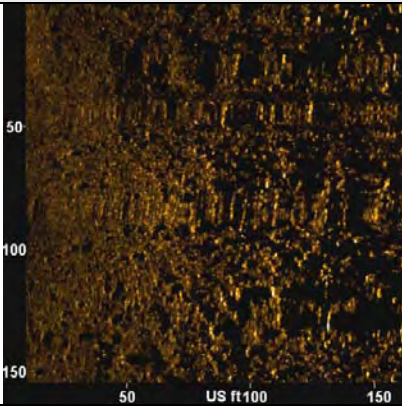
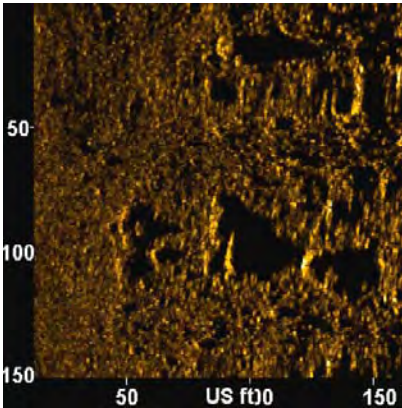
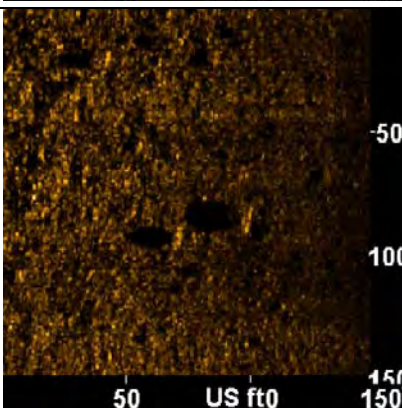
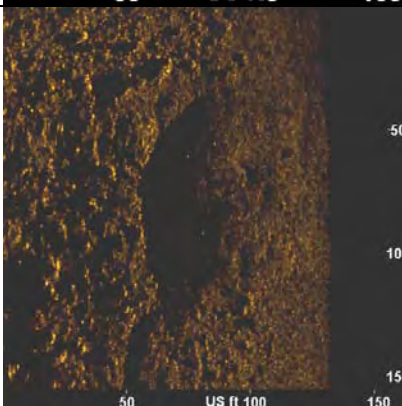
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	Contact 130 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 18:31:28 • Target Position (X) 955790.00 (Y) 640899.31 • Map Projection: FL83-EF • Range to Target: 27.72 US Feet • Fish Height: 4.69 US Feet • Heading: 106.500 degrees • Line Name: 05_111111132100 	Dimensions Target Height: 0.00 US Feet Target Length: 51.47 US Feet Target Shadow: 0.00 US Feet Target Width: 53.14 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris, less than one foot in height.
	Contact 131 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:20:07 • Target Position (X) 955828.88 (Y) 640585.75 • Map Projection: FL83-EF • Range to Target: 21.21 US Feet • Fish Height: 3.97 US Feet • Heading: 97.200 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 1.26 US Feet Target Length: 3.70 US Feet Target Shadow: 7.41 US Feet Target Width: 1.39 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 132 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:20:08 • Target Position (X) 955866.06 (Y) 640421.13 • Map Projection: FL83-EF • Range to Target: 30.72 US Feet • Fish Height: 3.89 US Feet • Heading: 95.000 degrees • Line Name: 02_111111121300 	Dimensions Target Height: 1.36 US Feet Target Length: 4.43 US Feet Target Shadow: 12.05 US Feet Target Width: 1.85 US Feet Mag Anomaly: 93 Avoidance Area: Classification: Debris Area: Channel Description: Miscellaneous piece of debris.

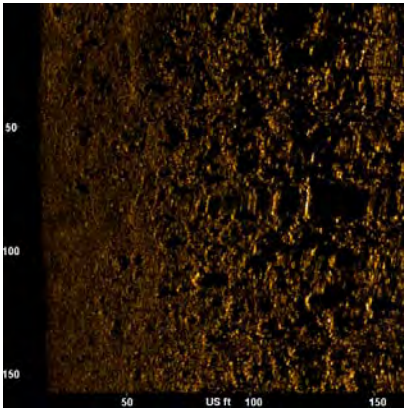
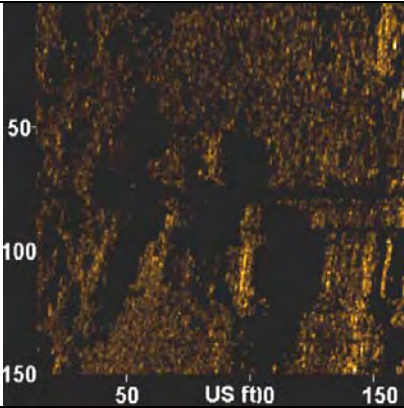
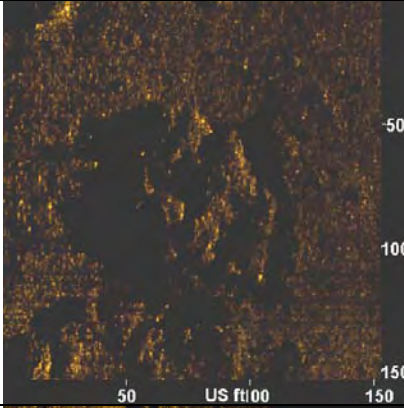
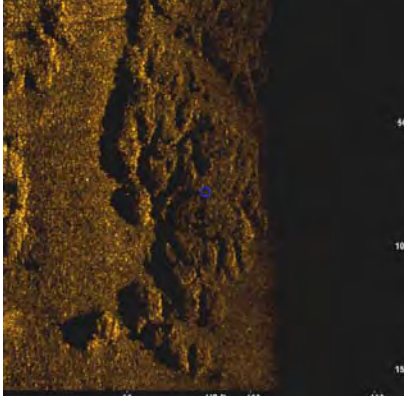
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	Contact 133 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:26:42 • Target Position (X) 955872.50 (Y) 641134.19 • Map Projection: FL83-EF • Range to Target: 36.59 US Feet • Fish Height: 6.38 US Feet • Heading: 262.600 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 46.47 US Feet Target Shadow: 0.00 US Feet Target Width: 41.66 US Feet Mag Anomaly: 106, 107 Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris, a foot or less in height.
	Contact 134 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:31:09 • Target Position (X) 955951.94 (Y) 641192.25 • Map Projection: FL83-EF • Range to Target: 24.87 US Feet • Fish Height: 4.86 US Feet • Heading: 263.500 degrees • Line Name: 08_1111111122700 	Dimensions Target Height: 2.07 US Feet Target Length: 0.00 US Feet Target Shadow: 12.18 US Feet Target Width: 0.00 US Feet Mag Anomaly: 106, 107 Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 3 feet in height.
	Contact 135 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:26:24 • Target Position (X) 956005.38 (Y) 641080.81 • Map Projection: FL83-EF • Range to Target: 20.69 US Feet • Fish Height: 6.07 US Feet • Heading: 261.800 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 40.47 US Feet Target Shadow: 0.00 US Feet Target Width: 107.05 US Feet Mag Anomaly: 78 Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris, less than a foot in height.

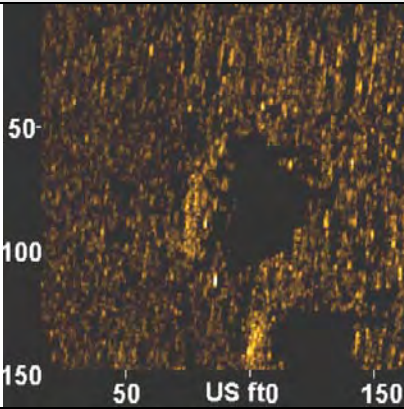
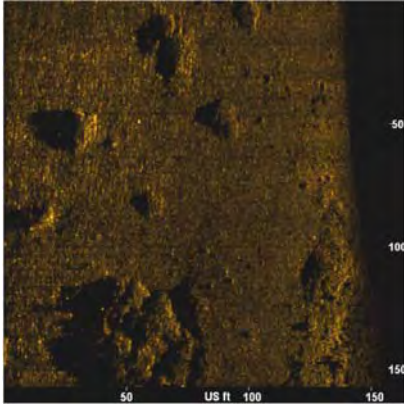
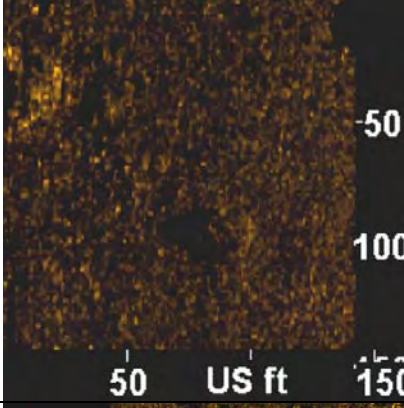
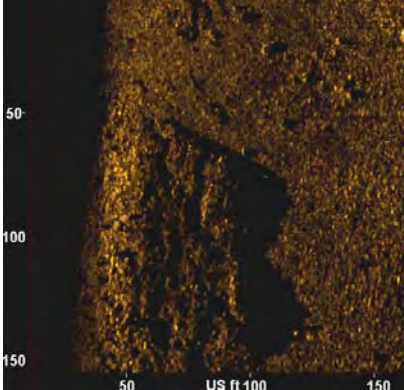
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	<p>Contact 136</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:31:03 • Target Position (X) 956007.00 (Y) 641047.00 • Map Projection: FL83-EF • Range to Target: 21.61 US Feet • Fish Height: 5.19 US Feet • Heading: 263.600 degrees • Line Name: 08_11111122700 	<p>Dimensions</p> <p>Target Height: 2.08 US Feet Target Length: 0.00 US Feet Target Shadow: 9.85 US Feet Target Width: 0.00 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from 1 to 2 feet in height.</p>
	<p>Contact 137</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 18:32:06 • Target Position (X) 956037.75 (Y) 640723.38 • Map Projection: FL83-EF • Range to Target: 29.07 US Feet • Fish Height: 4.79 US Feet • Heading: 97.800 degrees • Line Name: 05_11111132100 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 54.36 US Feet Target Shadow: 0.00 US Feet Target Width: 47.69 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris, less than one foot in height.</p>
	<p>Contact 138</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:20:38 • Target Position (X) 956045.56 (Y) 640433.50 • Map Projection: FL83-EF • Range to Target: 30.91 US Feet • Fish Height: 3.88 US Feet • Heading: 106.900 degrees • Line Name: 02_11111121300 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 113.76 US Feet Target Shadow: 0.00 US Feet Target Width: 62.63 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2 feet in height.</p>

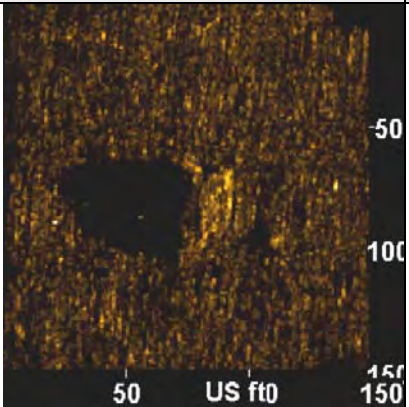
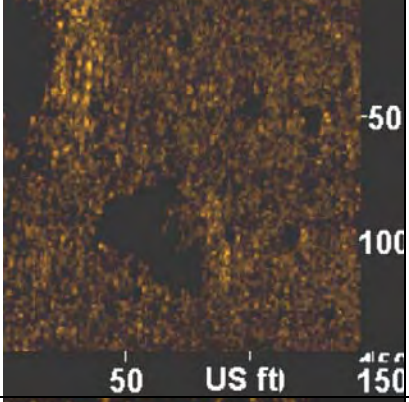
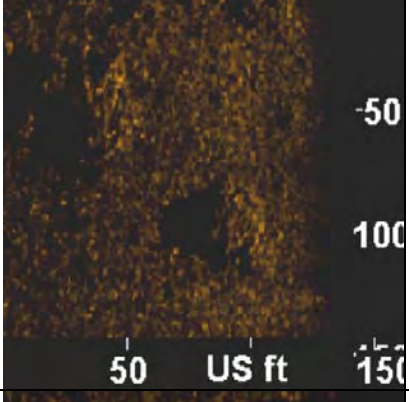
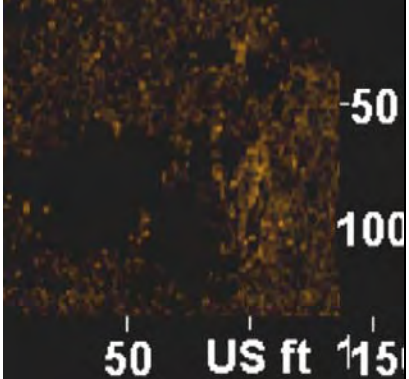
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	<p>Contact 139</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:20:53 • Target Position (X) 956172.31 (Y) 640622.31 • Map Projection: FL83-EF • Range to Target: 31.65 US Feet • Fish Height: 4.66 US Feet • Heading: 111.200 degrees • Line Name: 02_111111121300 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 71.77 US Feet Target Shadow: 0.00 US Feet Target Width: 108.14 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2 feet in height.</p>
	<p>Contact 140</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:15:28 • Target Position (X) 956181.81 (Y) 640512.88 • Map Projection: FL83-EF • Range to Target: 32.18 US Feet • Fish Height: 4.00 US Feet • Heading: 101.500 degrees • Line Name: 03_111111110300 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 79.28 US Feet Target Shadow: 0.00 US Feet Target Width: 53.60 US Feet Mag Anomaly: 70 Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium debris, ranging from less than a foot to 2 feet high.</p>
	<p>Contact 141</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:48:53 • Target Position (X) 956237.88 (Y) 640526.38 • Map Projection: FL83-EF • Range to Target: 29.23 US Feet • Fish Height: 4.49 US Feet • Heading: 102.300 degrees • Line Name: 01_111111124200 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 19.63 US Feet Target Shadow: 0.00 US Feet Target Width: 83.34 US Feet Mag Anomaly: 71 Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low relief debris, less than a foot in height.</p>

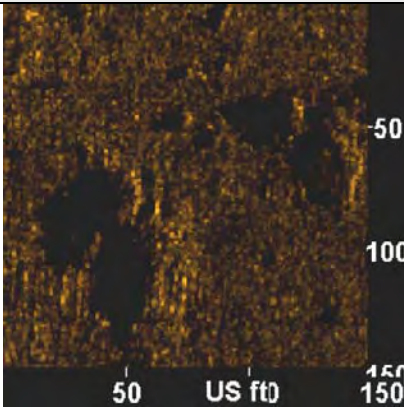
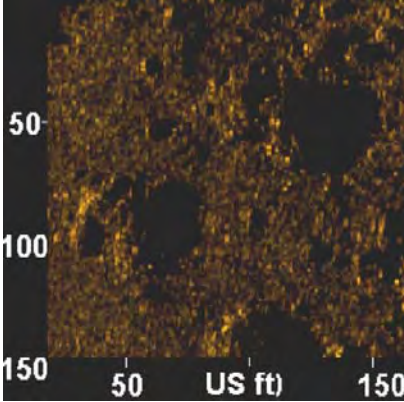
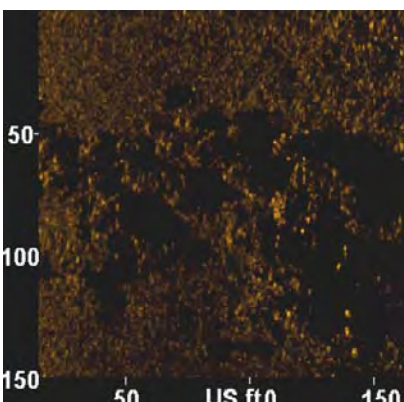
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	Contact 142 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:25:52 • Target Position (X) 956237.69 (Y) 641138.31 • Map Projection: FL83-EF • Range to Target: 36.83 US Feet • Fish Height: 6.95 US Feet • Heading: 263.700 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 31.34 US Feet Target Shadow: 0.00 US Feet Target Width: 28.48 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2 feet in height.
	Contact 143 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:30:25 • Target Position (X) 956259.31 (Y) 641234.44 • Map Projection: FL83-EF • Range to Target: 35.30 US Feet • Fish Height: 5.75 US Feet • Heading: 264.500 degrees • Line Name: 08_1111111122700 	Dimensions Target Height: 0.00 US Feet Target Length: 26.69 US Feet Target Shadow: 0.00 US Feet Target Width: 26.70 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of medium relief debris, 1 to 2 feet in height.
	Contact 144 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 18:32:57 • Target Position (X) 956353.25 (Y) 640914.88 • Map Projection: FL83-EF • Range to Target: 26.26 US Feet • Fish Height: 4.49 US Feet • Heading: 104.600 degrees • Line Name: 05_1111111132100 	Dimensions Target Height: 1.57 US Feet Target Length: 18.42 US Feet Target Shadow: 10.28 US Feet Target Width: 19.05 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.

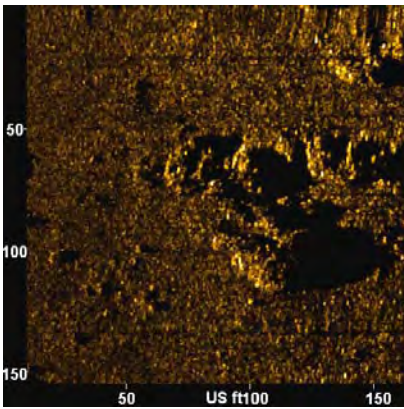
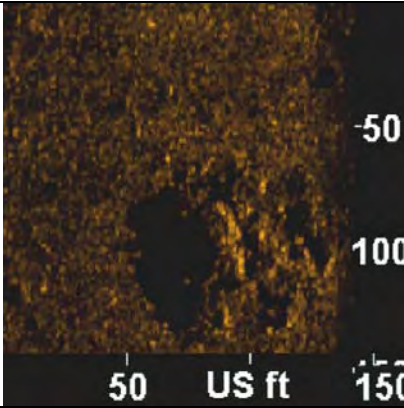
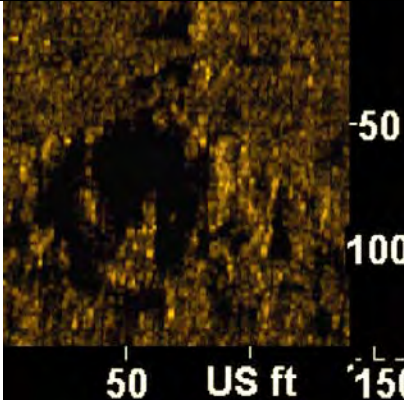
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	Contact 145 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:49:36 • Target Position (X) 956527.25 (Y) 640318.13 • Map Projection: FL83-EF • Range to Target: 31.95 US Feet • Fish Height: 5.76 US Feet • Heading: 102.100 degrees • Line Name: 01_111111124200 	Dimensions Target Height: 0.00 US Feet Target Length: 1000.00 US Feet Target Shadow: 0.00 US Feet Target Width: 330.00 US Feet Mag Anomaly: N/A Classification: Large Debris Field Area: Channel Description: Miscellaneous scattered pieces of debris.
	Contact 146 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:16:27 • Target Position (X) 956541.44 (Y) 640561.38 • Map Projection: FL83-EF • Range to Target: 22.77 US Feet • Fish Height: 4.79 US Feet • Heading: 101.400 degrees • Line Name: 03_111111110300 	Dimensions Target Height: 0.00 US Feet Target Length: 13.19 US Feet Target Shadow: 0.00 US Feet Target Width: 38.49 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of medium relief debris, 1 to 2 feet in height.
	Contact 147 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:25:04 • Target Position (X) 956589.56 (Y) 640956.19 • Map Projection: FL83-EF • Range to Target: 19.38 US Feet • Fish Height: 7.27 US Feet • Heading: 266.500 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 10.35 US Feet Target Shadow: 0.00 US Feet Target Width: 17.72 US Feet Mag Anomaly: 45 Classification: Debris Area: Channel Description: Miscellaneous two pieces of debris, 3 feet high.
	Contact 148 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:16:36 • Target Position (X) 956595.38 (Y) 640687.25 • Map Projection: FL83-EF • Range to Target: 15.89 US Feet • Fish Height: 4.76 US Feet • Heading: 107.700 degrees • Line Name: 03_111111110300 	Dimensions Target Height: 3.03 US Feet Target Length: 56.73 US Feet Target Shadow: 12.59 US Feet Target Width: 13.89 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: Channel Description: Large mound like feature.

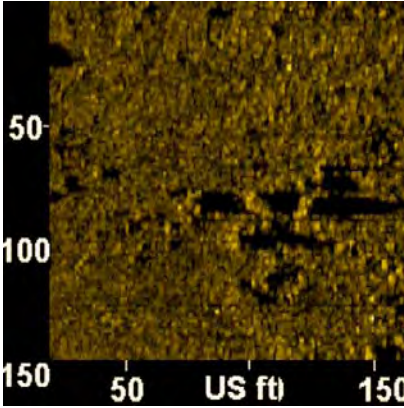
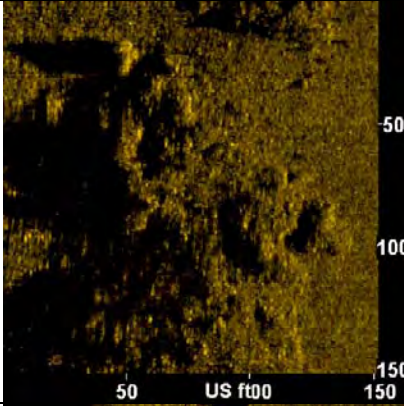
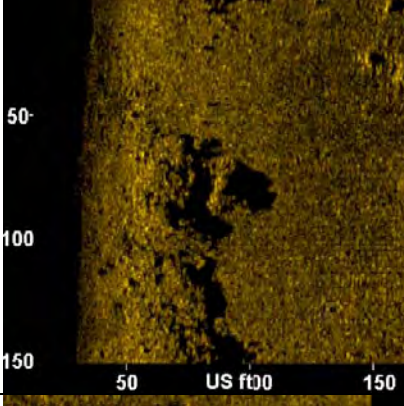
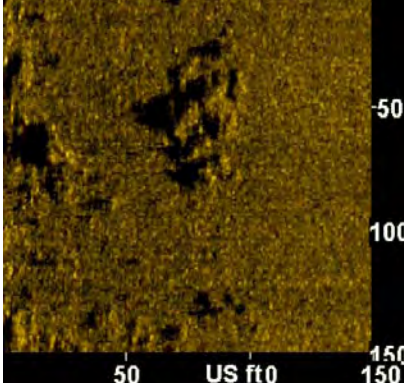
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	Contact 149 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 18:34:08 • Target Position (X) 956813.81 (Y) 640716.63 • Map Projection: FL83-EF • Range to Target: 35.80 US Feet • Fish Height: 4.79 US Feet • Heading: 107.800 degrees • Line Name: 05_111111132100 	Dimensions Target Height: 2.20 US Feet Target Length: 0.00 US Feet Target Shadow: 19.09 US Feet Target Width: 0.00 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2 feet high.
	Contact 150 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:28:26 • Target Position (X) 957097.69 (Y) 641184.69 • Map Projection: FL83-EF • Range to Target: 24.99 US Feet • Fish Height: 3.49 US Feet • Heading: 270.500 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 0.00 US Feet Target Length: 17.25 US Feet Target Shadow: 0.00 US Feet Target Width: 0.00 US Feet Mag Anomaly: 104 Classification: Debris Area: Channel Description: Miscellaneous two pieces of debris, 2 feet high.
	Contact 151 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:28:22 • Target Position (X) 957101.50 (Y) 640996.25 • Map Projection: FL83-EF • Range to Target: 32.08 US Feet • Fish Height: 2.27 US Feet • Heading: 269.500 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 1.21 US Feet Target Length: 33.12 US Feet Target Shadow: 20.32 US Feet Target Width: 32.18 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: Channel Description: Possible mound.
	Contact 152 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 18:35:04 • Target Position (X) 957136.81 (Y) 640890.44 • Map Projection: FL83-EF • Range to Target: 16.88 US Feet • Fish Height: 7.42 US Feet • Heading: 105.700 degrees • Line Name: 05_111111132100 	Dimensions Target Height: 3.60 US Feet Target Length: 120.03 US Feet Target Shadow: 9.61 US Feet Target Width: 32.38 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Description: Possible rock outcrop.

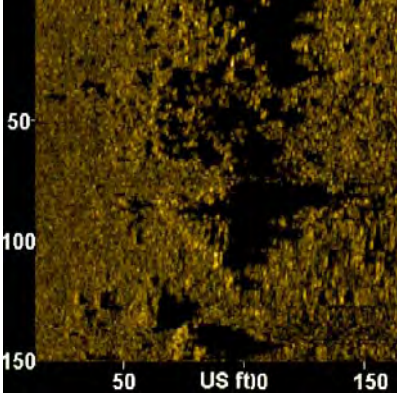
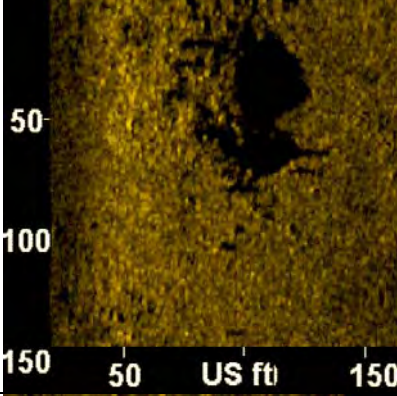
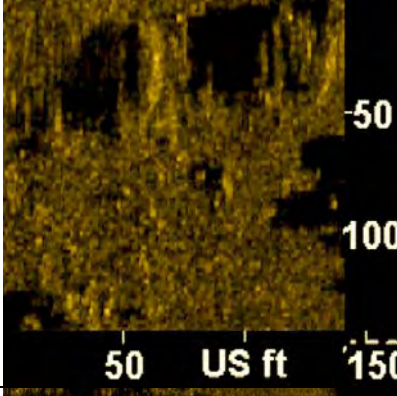
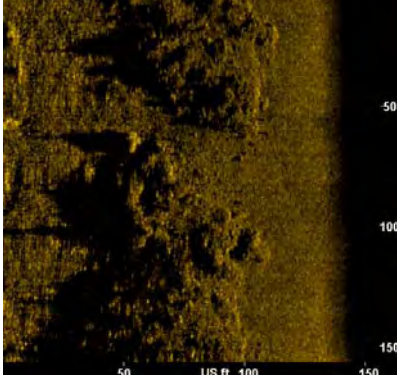
Contact Image	Contact Info	User Entered Info
	Contact 153 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:28:20 • Target Position (X) 957145.13 (Y) 641220.06 • Map Projection: FL83-EF • Range to Target: 37.45 US Feet • Fish Height: 2.79 US Feet • Heading: 267.400 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 0.00 US Feet Target Length: 25.88 US Feet Target Shadow: 0.00 US Feet Target Width: 18.07 US Feet Mag Anomaly: 103 Classification: Debris Area: Channel Description: Miscellaneous two pieces of debris, 1 foot in height.
	Contact 154 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:28:14 • Target Position (X) 957157.88 (Y) 640994.25 • Map Projection: FL83-EF • Range to Target: 30.85 US Feet • Fish Height: 4.27 US Feet • Heading: 265.100 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 0.00 US Feet Target Length: 50.00 US Feet Target Shadow: 0.00 US Feet Target Width: 20.00 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered medium to high relief debris, 2 to 3 feet in height.
	Contact 155 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:23:59 • Target Position (X) 957172.06 (Y) 640985.31 • Map Projection: FL83-EF • Range to Target: 16.63 US Feet • Fish Height: 2.88 US Feet • Heading: 259.500 degrees • Line Name: 07_11111112300 	Dimensions Target Height: 0.88 US Feet Target Length: 6.91 US Feet Target Shadow: 5.59 US Feet Target Width: 5.60 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 156 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:28:13 • Target Position (X) 957183.69 (Y) 641146.13 • Map Projection: FL83-EF • Range to Target: 16.91 US Feet • Fish Height: 4.33 US Feet • Heading: 265.100 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 2.06 US Feet Target Length: 58.42 US Feet Target Shadow: 9.39 US Feet Target Width: 21.91 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: Channel Description: Apparent mound.

Contact Image	Contact Info	User Entered Info
	Contact 157 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:28:09 • Target Position (X) 957186.75 (Y) 640962.44 • Map Projection: FL83-EF • Range to Target: 39.62 US Feet • Fish Height: 5.98 US Feet • Heading: 266.000 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 2.21 US Feet Target Length: 10.45 US Feet Target Shadow: 16.49 US Feet Target Width: 7.60 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 158 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:28:08 • Target Position (X) 957197.19 (Y) 641023.63 • Map Projection: FL83-EF • Range to Target: 21.12 US Feet • Fish Height: 5.95 US Feet • Heading: 265.200 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 1.77 US Feet Target Length: 12.98 US Feet Target Shadow: 6.93 US Feet Target Width: 7.79 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 159 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:23:54 • Target Position (X) 957203.25 (Y) 641013.06 • Map Projection: FL83-EF • Range to Target: 8.88 US Feet • Fish Height: 2.94 US Feet • Heading: 264.000 degrees • Line Name: 07_11111112300 	Dimensions Target Height: 2.04 US Feet Target Length: 10.41 US Feet Target Shadow: 7.81 US Feet Target Width: 7.82 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.
	Contact 160 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:23:53 • Target Position (X) 957218.44 (Y) 640994.25 • Map Projection: FL83-EF • Range to Target: 14.65 US Feet • Fish Height: 3.03 US Feet • Heading: 261.900 degrees • Line Name: 07_11111112300 	Dimensions Target Height: 1.87 US Feet Target Length: 12.67 US Feet Target Shadow: 11.13 US Feet Target Width: 9.57 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.

Contact Image	Contact Info	User Entered Info
	Contact 161 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:28:03 • Target Position (X) 957221.81 (Y) 640998.94 • Map Projection: FL83-EF • Range to Target: 27.53 US Feet • Fish Height: 6.63 US Feet • Heading: 268.700 degrees • Line Name: 08_111111122700 	Dimensions Target Height: 0.00 US Feet Target Length: 20.91 US Feet Target Shadow: 0.00 US Feet Target Width: 15.60 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous pieces of debris, about 1 foot in height.
	Contact 162 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:55:46 • Target Position (X) 957232.56 (Y) 641007.00 • Map Projection: FL83-EF • Range to Target: 21.97 US Feet • Fish Height: 5.08 US Feet • Heading: 261.100 degrees • Line Name: 06_11111115500 	Dimensions Target Height: 0.00 US Feet Target Length: 70.00 US Feet Target Shadow: 0.00 US Feet Target Width: 100.00 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous three pieces of debris, 2 to 3 feet in height.
	Contact 163 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:23:47 • Target Position (X) 957253.56 (Y) 641107.25 • Map Projection: FL83-EF • Range to Target: 19.99 US Feet • Fish Height: 3.53 US Feet • Heading: 262.100 degrees • Line Name: 07_11111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 31.05 US Feet Target Shadow: 0.00 US Feet Target Width: 38.47 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from less than a foot to 2 feet high.

Contact Image	Contact Info	User Entered Info
	<p>Contact 164</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 17:28:03 • Target Position (X) 957258.06 (Y) 641198.94 • Map Projection: FL83-EF • Range to Target: 35.85 US Feet • Fish Height: 6.65 US Feet • Heading: 267.500 degrees • Line Name: 08_111111122700 	<p>Dimensions</p> <p>Target Height: 0.00 US Feet Target Length: 0.00 US Feet Target Shadow: 0.00 US Feet Target Width: 0.00 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of medium to high relief debris, ranging from 1 to 3 feet high.</p>
	<p>Contact 165</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:55:39 • Target Position (X) 957283.69 (Y) 640898.69 • Map Projection: FL83-EF • Range to Target: 12.70 US Feet • Fish Height: 4.79 US Feet • Heading: 263.000 degrees • Line Name: 06_111111115500 	<p>Dimensions</p> <p>Target Height: 2.90 US Feet Target Length: 14.64 US Feet Target Shadow: 9.43 US Feet Target Width: 11.02 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: Channel Description: Apparent mound.</p>
	<p>Contact 166</p> <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:55:35 • Target Position (X) 957315.81 (Y) 640832.94 • Map Projection: FL83-EF • Range to Target: 32.22 US Feet • Fish Height: 4.49 US Feet • Heading: 262.400 degrees • Line Name: 06_111111115500 	<p>Dimensions</p> <p>Target Height: 0.59 US Feet Target Length: 13.75 US Feet Target Shadow: 4.41 US Feet Target Width: 4.15 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.</p>

Contact Image	Contact Info	User Entered Info
	Contact 167 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:23:38 • Target Position (X) 957328.50 (Y) 641133.25 • Map Projection: FL83-EF • Range to Target: 27.58 US Feet • Fish Height: 4.29 US Feet • Heading: 266.900 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 40.00 US Feet Target Shadow: 0.00 US Feet Target Width: 7.00 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered low relief pieces of debris, 1 foot and less in height.
	Contact 168 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:23:35 • Target Position (X) 957344.06 (Y) 640956.94 • Map Projection: FL83-EF • Range to Target: 26.83 US Feet • Fish Height: 4.42 US Feet • Heading: 266.100 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 3.50 US Feet Target Length: 22.47 US Feet Target Shadow: 28.01 US Feet Target Width: 0.00 US Feet Mag Anomaly: 43 Classification: Seafloor Feature Area: Channel Description: Apparent mound.
	Contact 169 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:55:30 • Target Position (X) 957350.50 (Y) 640983.94 • Map Projection: FL83-EF • Range to Target: 14.82 US Feet • Fish Height: 4.88 US Feet • Heading: 261.700 degrees • Line Name: 06_111111115500 	Dimensions Target Height: 1.46 US Feet Target Length: 55.43 US Feet Target Shadow: 4.89 US Feet Target Width: 19.07 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: Channel Description: Apparent mounds.
	Contact 170 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:55:29 • Target Position (X) 957363.31 (Y) 640877.00 • Map Projection: FL83-EF • Range to Target: 19.29 US Feet • Fish Height: 4.88 US Feet • Heading: 262.100 degrees • Line Name: 06_111111115500 	Dimensions Target Height: 1.42 US Feet Target Length: 23.63 US Feet Target Shadow: 6.17 US Feet Target Width: 10.03 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous piece of debris.

Contact Image	Contact Info	User Entered Info
	Contact 171 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:23:28 • Target Position (X) 957404.75 (Y) 641132.25 • Map Projection: FL83-EF • Range to Target: 27.71 US Feet • Fish Height: 4.59 US Feet • Heading: 264.500 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 0.00 US Feet Target Length: 67.93 US Feet Target Shadow: 0.00 US Feet Target Width: 29.87 US Feet Mag Anomaly: N/A Classification: Small Debris Field Area: Channel Description: Miscellaneous scattered pieces of low to medium relief debris, ranging from a foot to 3 feet high.
	Contact 172 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:55:23 • Target Position (X) 957409.00 (Y) 640978.75 • Map Projection: FL83-EF • Range to Target: 13.31 US Feet • Fish Height: 5.47 US Feet • Heading: 264.000 degrees • Line Name: 06_111111115500 	Dimensions Target Height: 3.28 US Feet Target Length: 21.85 US Feet Target Shadow: 9.77 US Feet Target Width: 10.80 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: Channel Description: Apparent mound.
	Contact 173 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:55:22 • Target Position (X) 957418.25 (Y) 640850.50 • Map Projection: FL83-EF • Range to Target: 27.52 US Feet • Fish Height: 5.37 US Feet • Heading: 265.100 degrees • Line Name: 06_111111115500 	Dimensions Target Height: 0.00 US Feet Target Length: 24.12 US Feet Target Shadow: 0.00 US Feet Target Width: 32.40 US Feet Mag Anomaly: N/A Classification: Debris Area: Channel Description: Miscellaneous three pieces of debris, about 1 foot in height.
	Contact 174 <ul style="list-style-type: none"> • Sonar Time at Target: 11/11/2011 16:23:25 • Target Position (X) 957418.44 (Y) 640967.19 • Map Projection: FL83-EF • Range to Target: 23.34 US Feet • Fish Height: 4.78 US Feet • Heading: 263.600 degrees • Line Name: 07_111111112300 	Dimensions Target Height: 3.59 US Feet Target Length: 148.97 US Feet Target Shadow: 22.78 US Feet Target Width: 43.82 US Feet Mag Anomaly: N/A Classification: Seafloor Feature Area: Channel Description: Apparent mounds.

V. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Panamerican conducted a comprehensive cultural resources remote sensing survey for the USACE, Jacksonville District of two areas in Broward County, Florida: a portion of the Port Everglades channel and the proposed ODMDS. Comprised of a magnetometer and sidescan sonar, a subbottom profiler not required, the survey located a total of 282 magnetic anomalies and 174 sidescan sonar contacts. Analysis of the data indicates that of all the recorded anomalies and contacts, nine anomalies and three contacts, comprising three separate clusters and one single contact, should be considered as potentially significant resources.

Presented in Table 5-01 and Figure 5-01, the eight anomalies are classified as unknowns or debris and comprise three clusters, including M038 and C023; M176, M177, M227, M226 and C116; M226, M261 and M262; and one single sonar contact, C070. Together the clustered anomalies form moderate strength dipoles of fairly significant length, indicating potentially significant submerged cultural resources. In addition, the cluster consisting of M266, M261 and M262 has a magnetic moment with negative to the north, indicating a strong possibility of a shipwreck site. Because of these factors, the targets must be considered as potentially significant.

In addition to these, Anomaly M156 appears to be related to a submerged breakwater located south of the Project Area, the breakwater listed in the FMSF as 8BD4255. From the appearance of the anomaly, the source lies outside the Project Area. Although the breakwater was determined potentially NRHP eligible (Tubby and Watts 2006b), it is unlikely to be affected by the current construction project and no further work is recommended.

Table 5-01. Potentially Significant Targets.

Target	Area	Easting	Northing	Map	Association	Description
M038	ODMDS	976466.42	656117.46	5	C023	debris
M156	Channel	952934.00	640573.74	1		Breakwater, 8BD4255
M176	Channel	954721.74	640999.15	1	M177, M227, M266, C116	vicinity of buoy, debris on SS
M177	Channel	954608.61	640995.86	1	M176, M227, M266, C116	vicinity of buoy, debris on SS
M226	Channel	955179.38	641104.59	1	M261, M262	unknown
M227	Channel	954667.39	641086.12	1	M176, M177, M266, C116	vicinity of buoy, debris on SS
M261	Channel	955177.21	641192.78	1	M226, M262	unknown
M262	Channel	955140.58	641192.78	1	M226, M261	unknown
M266	Channel	954670.35	641070.13	1	M176, M177, M227, C116	vicinity of buoy, debris on SS
C023	ODMDS	976512	656109	5	M038	debris
C070	ODMDS	969699	657431	2		debris
C116	Channel	954658	641066	1	M176, M177, M227, M266	small debris field

Because the parameters for the proposed project are unknown (i.e., dredging, fill), it is not known if any of these potentially significant cultural resources will be adversely affected by project activities. As an agency of the Federal Government, the USACE must consider the effects that their project activities will have on cultural resources. It is therefore, recommended that the USACE, Jacksonville District determine the exact parameters of the project impact and subsequently determine if any of the potentially significant sites will be adversely impacted. If

the potentially significant sites will be impacted and cannot be avoided, it is recommended that the sites be further investigated to determine if they indeed do represent cultural resources sites. If they do represent cultural resources sites, it is recommended that the USACE, Jacksonville District conduct an assessment of the integrity of the sites and their historical significance, based on NRHP nomination eligibility criteria. Based on site type, subsequent investigations, if required, should include, but not be limited to, archaeological diver assessment, ROV inspection, and/or coring. Discussions should be conducted on which method(s) should be employed on the respective feature.

PROCEDURES TO DEAL WITH UNEXPECTED DISCOVERIES

Reasonable effort has been made during this investigation to identify and evaluate possible locations of historic archaeological sites and potential prehistoric site locations. However, the possibility exists that evidence of prehistoric and historic resources may yet be encountered within the project limits not previously identified in the above conclusions and recommendations. Should any evidence of historic resources be discovered during dredging activities, it is recommended that all work in that portion of the project area cease immediately. Evidence of historic resources includes: aboriginal or historic pottery, prehistoric stone tools, bone or shell tools, as well as historic shipwreck remains. Should questionable materials be uncovered during dredging of the project area, procedures contained in Advisory Council on Historic Preservation 36 CFR Part 800 will take effect.

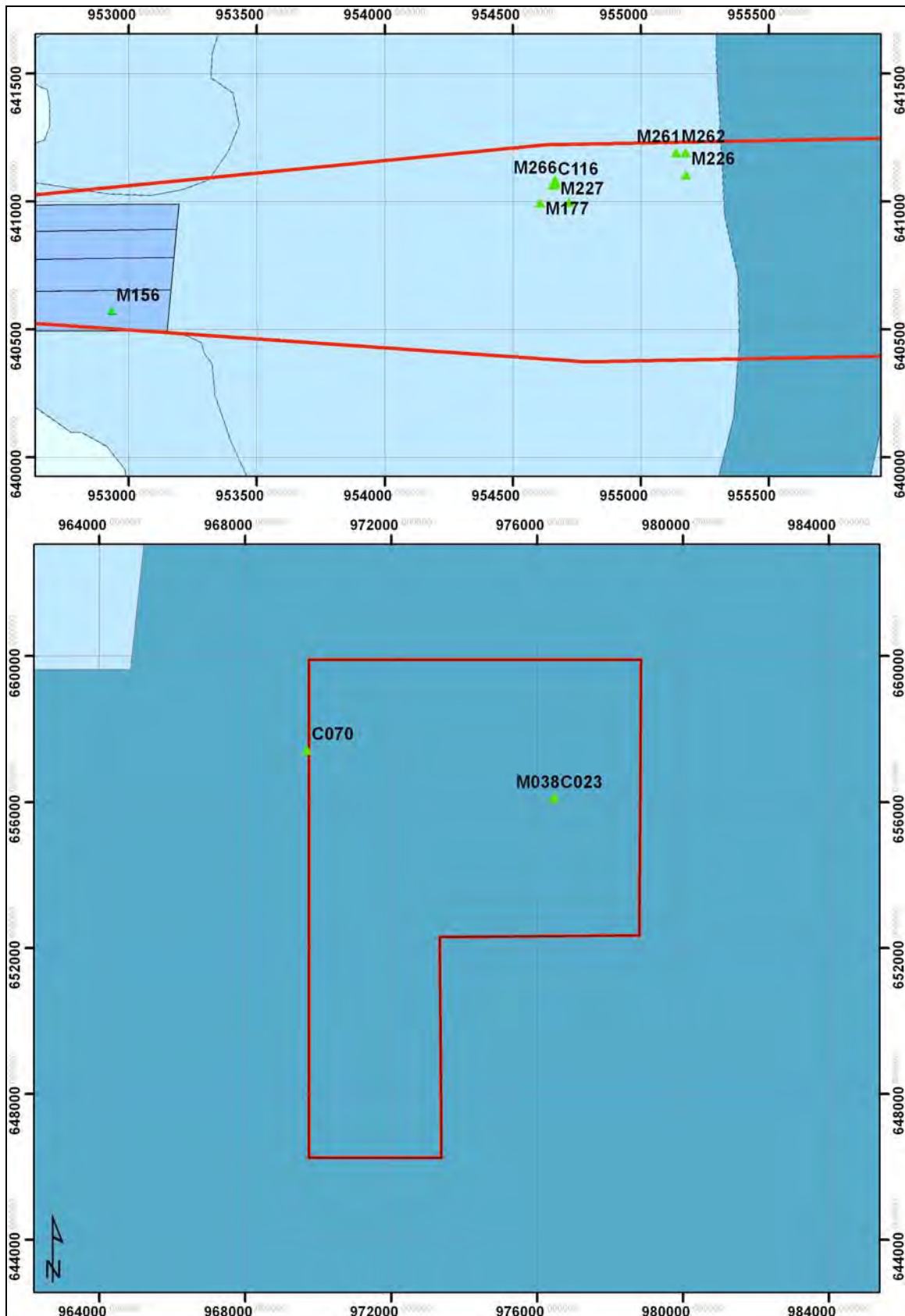


Figure 5-01. Targets recommended for avoidance or further investigation.

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VI. REFERENCES CITED

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APPENDIX A: FLORIDA 1A-32 PERMIT



FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES
ARCHAEOLOGICAL RESEARCH PERMIT

Permit No. 1112.009

Field Begin Date: 10/15/2011 Field End Date: 11/1/2011

PERMITTEE/AUTHORIZED ENTITY:

Panamerican Consultants, Inc. Memphis Office

Report/Artifact Due Date: 1/15/2012

Project: Submerged Cultural Resources Remote
Sensing Survey of Port Everglades Channel & Ocean
Dredged Material Disposal Site

c/o Stephen James
91 Tillman Street
Memphis, Tennessee 38111

This permit is issued under the authority of Chapters 267.031 (1) and 267.12, Florida Statutes (F.S.) and Rule 1A-32, Florida Administrative Code (F.A.C.), and is administered by the Florida Bureau of Archaeological Research (BAR), Florida Division of Historical Resources (DHR).

ACTIVITY DESCRIPTION:

Magnetometer & Sidescan Sonar

LOCATION DESCRIPTION:

Offshore Port Everglades Channel Entrance
U.S. Army Corps of Engineers, Jacksonville District

GENERAL CONDITIONS:


1. The Principal Investigator listed above or another qualified archaeologist designated by the applicant shall be responsible for all archaeological investigations, production of a final report, and be on site during all fieldwork.
2. A copy of this permit shall be provided to the land managing agency (when applicable) and field personnel shall carry a copy during fieldwork.
3. The permittee shall (initial each item as indicated):
 - a. prepare a final report that meets standards and guidelines required by Rule 1A-46, F.A.C., including the necessary Florida Master Site File forms. *[Signature]*
 - b. inform the BAR permit administrator that a report has been completed and submitted to the Division of Historical Resources; or submit a copy of the final report to the BAR permit administrator; *[Signature]*
 - c. provide proper curation and conservation of recovered artifacts and other recovered site materials until such time as those artifacts and other site materials are conveyed to the BAR for curation; *[Signature]*
 - d. convey all artifacts and related materials obtained from state-owned or controlled land to the

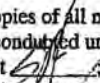

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☐ Director's Office
(850) 245-6300 • FAX: 245-6436

☒ Archaeological Research
(850) 245-6444 • FAX: 245-6452

☐ Historic Preservation
(850) 245-6333 • FAX: 245-6437

BAR permit administrator for permanent curation or processing for loan 

- e. convey copies of all notes, maps, photographs, videotapes, and other field records pertaining to research conducted under this permit to the BAR permit administrator following completion of the project 
 - f. and not remove from a stable environment artifacts and materials which the permit recipient is unable to properly curate and conserve before conveying to BAR 
4. The effective field investigation dates are subject to receipt of permission from the land management agency and, in some instances, State/Federal dredge-and-fill permitting programs. Those agencies may also require work performance conditions relevant to their natural resource management and permitting responsibilities. A representative of the land managing agency (if one exists) will need to sign this permit document prior to BAR executing this permit (see page 3).
 5. Unless approved in writing by BAR, no work beyond that described in the "ACTIVITY DESCRIPTION" and attached to your application shall be performed.
 6. This permit is valid for up to one year following the requested report due date. Requests for approval for amendments to fieldwork, fieldwork end date and report/artifact due date are required during this time. Such requests may be made and approved by phone, email, or in writing during this time and do not require amendments to this document.
 7. In any release of information, including public presentations, media contacts, and the final written report, there shall be acknowledgement that the portion of the project involving state-owned and controlled land was conducted under the terms of an archaeological research permit issued by the Florida Department of State, Division of Historical Resources, Bureau of Archaeological Research.
 8. If Unmarked Human Burials are discovered, permit recipient shall comply with the provisions of 872.05, F.S., and when appropriate, Rule 1A-44, F.A.C. Specifically, upon discovery of unmarked human remains, all activities that might further affect those remains shall be halted and the remains protected from further disturbance until an appropriate course of action has been determined by the local medical examiner or by the State Archaeologist, as appropriate.
 9. In issuing this permit, the State assumes no liability for the acts, omissions to act or negligence of the permittee, its agents, servants or employees; nor shall this permittee exclude liability for its own acts, omissions to act or negligence to the State.
 10. The permittee, unless the permittee is an agency of the State, agrees to assume all responsibility for, indemnify, defend and hold harmless the Division of Historical Resources from and against any and all claims, demands, or liabilities, or suits of any nature whatsoever arising out of, because of, or due to any act or occurrence of omission or commission arising out of the permittee's operations pursuant to this permit and shall investigate all claims at its own expense. In addition, the permittee hereby agrees to be responsible for any injury or property damage resulting from any activities conducted by the permittee.
 11. The parties hereto agree that the permittee, its officers, agents and employees, in performance of this permit, shall act in the capacity of an independent contractor and not as an officer, employee, or agent of the State.

The undersigned, as representative of the Permittee/Authorized Entity, understands and accepts the terms of this 1A-32 Archaeological Research Permit.


Signature

Date: 8/19/11

The undersigned, as representative of the land managing agency for the managed area/state property described in the "LOCATION DESCRIPTION" section of this document, hereby permits the activity described above.

Title:

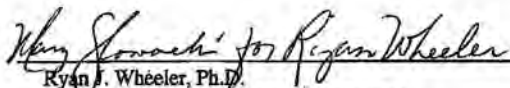
Date: _____

This permit will not become effective until it has been executed by the Chief of BAR. Before BAR can execute this permit, the Permittee must have a land management representative (if applicable) sign in the space provided above. Please send the signed permit to the Permit Administrator at the address above.

A copy of the executed permit will be sent to you prior to commencing fieldwork.

Executed in Tallahassee, Florida

STATE OF FLORIDA
DEPARTMENT OF STATE


Ryan J. Wheeler, Ph.D.
Chief, Bureau of Archaeological Research

8/19/11
Date of Issue

Enclosures:

Rule 1A-46, F.A.C.
BAR Collections and Curation Guidelines
How to Package Documents, Florida Master Site File

Copies furnished to:

RJW/kmp

APPENDIX B: FLORIDA SURVEY LOG SHEET

Ent D (FMSF only) __/__/__

Survey # (FMSF only) _____



Survey Log Sheet

Florida Master Site File

Version 2.0 9/97

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Identification and Bibliographic Information

Survey Project (Name and project phase) Submerged Cultural Resources Remote Sensing Survey of the Port Everglades Channel and Ocean Dredged Material Disposal (ODMDS) Site, Broward County, Florida

Report Title (exactly as on title page) Submerged Cultural Resources Remote Sensing Survey of the Port Everglades Channel and Ocean Dredged Material Disposal (ODMDS) Site, Broward County, Florida _____

Report Author(s) (as on title page— individual or corporate; last names first) _____

Publication Date (year) 2011 **Total Number of Pages in Report** (Count text, figures, tables, not site forms) 171 pages

Publication Information (If relevant, series and no. in series, publisher, and city. For article or chapter, cite page numbers. Use the style of *American Antiquity*: see *Guide to the Survey Log Sheet*.) _____

Supervisor(s) of Fieldwork (whether or not the same as author[s]; last name first) Faught, Michael K. _____

Affiliation of Fieldworkers (organization, city) Panamerican Consultants, Inc. _____

Key Words/Phrases (Don't use the county, or common words like *archaeology*, *structure*, *survey*, *architecture*. Put the most important first. Limit each word or phrase to 25 characters.) marine sidescan magnetometer _____

Survey Sponsors (corporation, government unit, or person who is directly paying for fieldwork)

Name U.S Army Corps of Engineers Jacksonville District _____

Address/Phone 701 San Marco Blvd, Jacksonville, FL 800-291-9405 _____

Recorder of Log Sheet Lydecker, Andrew D.W. **Date Log Sheet Completed** 12/06/2011

Is this survey or project a continuation of a previous project? ☒ No ☐ Yes:

Previous survey #(s) [FMSF only] _____

Mapping

Counties (List each one in which field survey was done - do not abbreviate; use supplement sheet if necessary) _____

Broward _____

USGS 1:24,000 Map(s) : Map Name/Date of Latest Revision (use supplement sheet if necessary): _____

Port Everglades 1986 _____

Description of Survey Area

Dates for Fieldwork: Start 11/11/2011 End 11/15/2011 **Total Area Surveyed** (fill in one) _____ hectares
2624 acres

Number of Distinct Tracts or Areas Surveyed 2

If Corridor (fill in one for each): **Width** _____ meters _____ feet **Length** _____ kilometers _____ miles

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Phone 850-245-6440, Suncom 205-6440, FAX 850-245-6439, Email fmsfile@dos.state.fl.us, Web <http://www.dos.state.fl.us/dhr/msf/>

Panamerican Server: Editor: 1. Current Draft Reports: 2. Maritime: 31271.mar-Port Everglades Chnnl+ ODMDS:08b.(31271.m)Prt Evrglds-survey log sheet.docx 02/28/12 12:35 PM

Survey Log Sheet of the Florida Master Site File

Research and Field Methods

Types of Survey (check all that apply): ☒ archaeological ☐ architectural ☒ historical/archival ☒ underwater ☐ other: _____

Preliminary Methods (✓ Check as many as apply to the project as a whole. If needed write others at bottom).

☐ Florida Archives (Gray Building) ☒ library research- *local public* ☐ local property or tax records ☐ windshield
☐ Florida Photo Archives (Gray Building) ☐ library-special collection - *nonlocal* ☐ newspaper files ☐ aerial photography
☐ FMSF site property search ☐ Public Lands Survey (maps at DEP) ☐ literature search
☒ FMSF survey search ☐ local informant(s) ☐ Sanborn Insurance maps
☐ other (describe) _____

Archaeological Methods (Describe the proportion of properties at which method was used by **writing in** the corresponding letter. Blanks are interpreted as "None.")

F(-ew: 0-20%), S(-ome: 20-50%); M(-ost: 50-90%); or A(-ll, Nearly all: 90-100%). If needed write others at bottom.

☐ Check here if **NO** archaeological methods were used.

____ surface collection, controlled ☐ other screen shovel test (size: _____) ☐ block excavation (at least 2x2 M)
 ____ surface collection, uncontrolled ☐ water screen (finest size: _____) ☐ soil resistivity
 ____ shovel test-1/4" screen ☐ posthole tests ☒ magnetometer
 ____ shovel test-1/8" screen ☐ auger (size: _____) ☒ side scan sonar
 ____ shovel test 1/16" screen ☐ coring ☐ unknown
 ____ shovel test-unscreened ☐ test excavation (at least 1x2 M)
 ____ other (describe): _____

Historical/Architectural Methods (Describe the proportion of properties at which method was used by **writing in** the corresponding letter. Blanks are interpreted as "None.")

F(-ew: 0-20%), S(-ome: 20-50%); M(-ost: 50-90%); or A(-ll, Nearly all: 90-100%). If needed write others at bottom.

☒ Check here if **NO** historical/architectural methods were used.

____ building permits ☐ demolition permits ☐ neighbor interview ☐ subdivision maps
 ____ commercial permits ☐ exposed ground inspected ☐ occupant interview ☐ tax records
 ____ interior documentation ☐ local property records ☐ occupation permits ☐ unknown
 ____ other (describe): _____

Scope/Intensity/Procedures _____

Survey Results (cultural resources recorded)

Site Significance Evaluated? ☐ Yes ☒ No If Yes, circle NR-eligible/significant site numbers below.

Site Counts: Previously Recorded Sites _____ 0 _____ Newly Recorded Sites 0 _____

Previously Recorded Site #'s with Site File Update Forms (List site #'s without "8." Attach supplementary pages if necessary) _____

Newly Recorded Site #'s (Are you sure all are originals and not updates? Identify methods used to check for updates, ie, researched the FMSF records. List site #'s without "8." Attach supplementary pages if necessary.) _____

Site Form Used: ☒ SmartForm ☐ FMSF Paper Form ☐ Approved Custom Form: Attach copies of written approval from FMSF Supervisor.

DO NOT USE SITE FILE USE ONLY DO NOT USE

BAR Related

☐ 872 ☐ 1A32

BHP Related

☐ State Historic Preservation Grant

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☐ CARL

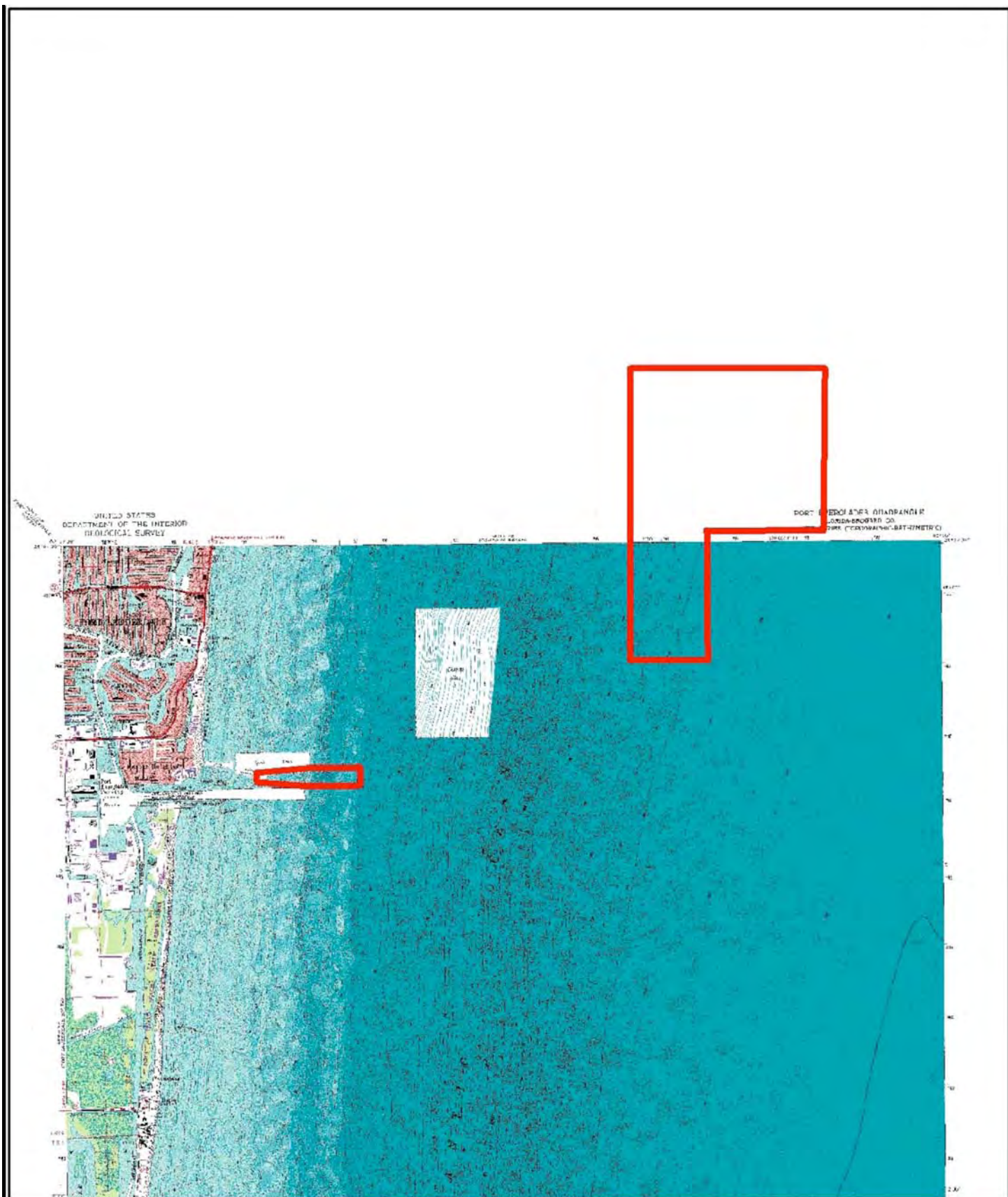
☐ UW

☐ Compliance Review: CRAT

ATTACH PLOT OF SURVEY AREA ON PHOTOCOPIES OF USGS 1:24,000 MAP(S)

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